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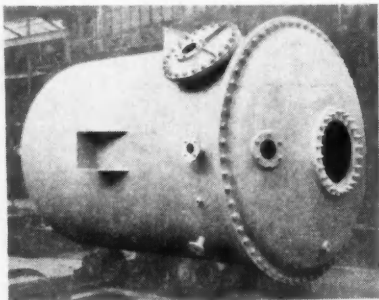
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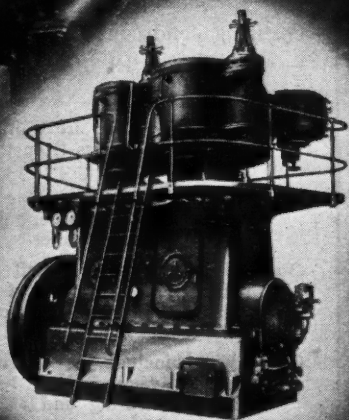
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## INDEX TO ADVERTISERS IN THIS ISSUE

	Page		Page
Accrington Brick & Tile Co. ...	xiv	Kestner Evaporator & Engineering Co., Ltd. ...	x & xiii
Berk, F. W. & Co., Ltd. ...	xv	Laporte Chemicals, Ltd. ...	xiii
Blackwell's Metallurgical Works Ltd. ...	x	Leigh & Sons Metal Works ...	xxiv
Blundells & T. Albert Crompton & Co., Ltd. Cover	iii	Leitch, John W. & Co., Ltd. ...	viii
Boots Pure Drug Co., Ltd. ...	iv	Lennox Foundry Co., Ltd. ...	xxiv
British Aromatics, Ltd. ...	668	National Enamels, Ltd. ...	xii
British Carbo-Norit Union Ltd., The ...	x	Organic Dyestuffs, Ltd. ...	xvi
British Drug Houses, Ltd., The ...	xviii	Orr, Geo. W. & Co., Ltd. ...	xvi
British Traders & Shippers, Ltd. ...	ii	Perry & Hope, Ltd. ...	xxiii
Brotherhood, Peter, Ltd. ...	i	Petrochemicals, Ltd. ...	vii
Clark, T. & C., & Co., Ltd. ...	xiv	Phillips Telescopic Taps, Ltd. ...	vi
Classified Advertisements ...xx, xxi, xxii & xxiii		Porter, S. & Co., Ltd. ...	xviii
Cole & Wilson, Ltd. ...	xxiii	Quickfit & Quartz, Ltd. ...	v
Collis, J. & Sons, Ltd. ...	ix	Somerville & Morrison, Ltd. ...	668
"Drum" Engineering Co., Ltd., The Cover	iii	Spence, Peter & Sons, Ltd. ...	viii
Evans, Adlard & Co., Ltd. ...	xix	Spencer, Chapman & Messel, Ltd. ...	Cover ii
Foyle, W. & G., Ltd. ...	xxiv	Staveley Coal & Iron Co., Ltd., The ...	xi
Gethings, B. & Sons ...	Cover iii	Steel, J. M. & Co., Ltd. ...	xix
Grazebrook, M. & W., Ltd. ...	Cover ii	Swift & Co., Pty., Ltd. ...	xii
Harris, Francis W. & Co., Ltd. ...	x	T. & T. Works, Ltd. ...	xxiv
Harris (Lostock Gramal), Ltd. ...	Cover iii	Tate, James & Co. ...	vi
Haughton's Metallic Co., Ltd. ...	xxiv	Tipple, W. & C., Ltd. ...	xxiv
Holland, B.A., Engineering Co., Ltd., The ...	x	Tretol, Ltd. ...	xii
Hopkin & Williams, Ltd. ...	iii	Wilkinson, James & Son, Ltd. ...	iv
Howards & Sons, Ltd. ...	Front cover	Windsor, H. & Co., Ltd. ...	Cover iv
Imperial Chemical Industries, Ltd. ...	xvii	Wolters Balances, Ltd. ...	xii
Imperial Typewriter Co., Ltd. ...	xvi	Wood & Fairweather ...	xxiv
Jones Gas Process Co., Ltd. ...	vi		



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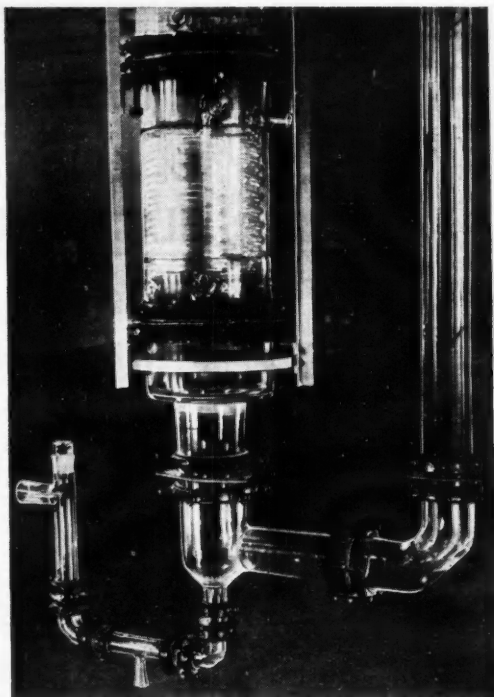
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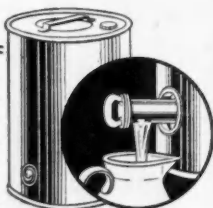
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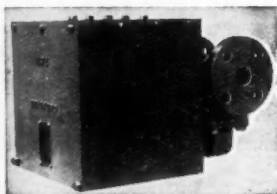
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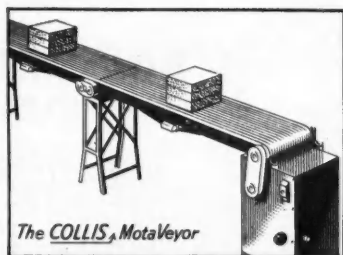
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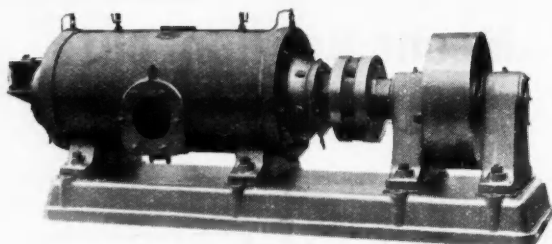
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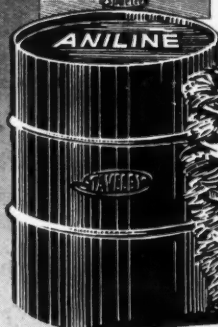
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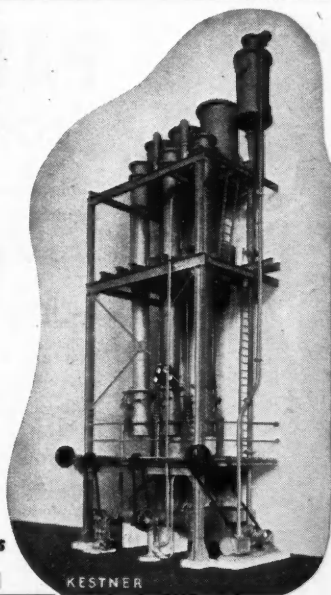
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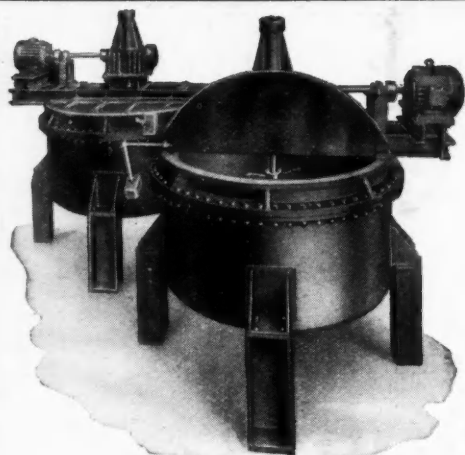
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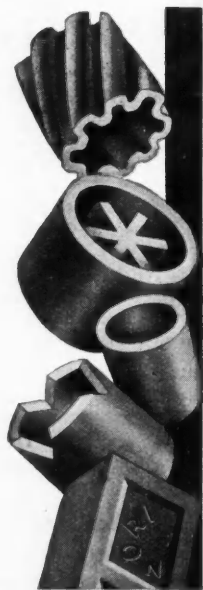
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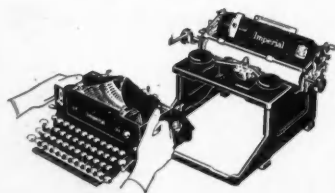
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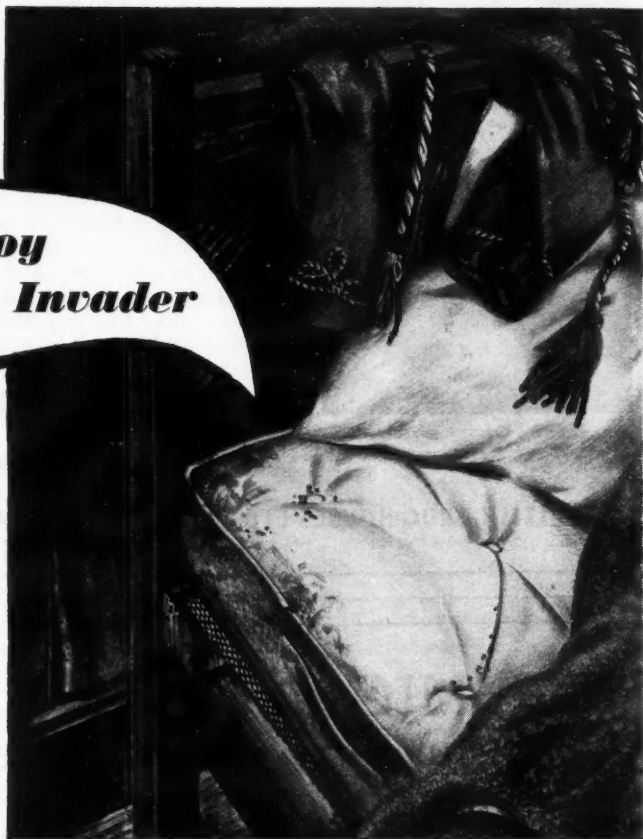
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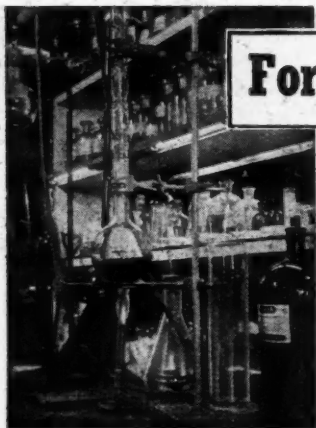
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## Monopolies

THE Monopoly (Inquiry and Control) Bill seems designed to introduce an entirely new chapter in British industrial history. Its provisions require the closest examination, regardless of the prevalent theory that any arrangement made between firms that are theoretically competitors is likely to be contrary to the public interest. In all political parties, members without commercial experience are prone to accept that view without much questioning. There is danger, therefore, that this Bill may come to be regarded in Parliament as one of those measures of which the value is so self-evident that it can be passed without careful scrutiny and amendment.

Monopolistic practices are an "evil" that has been with us always. Some 200 years ago Adam Smith wrote that "people of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public." English history has whole chapters upon monopolies; they have been used to raise revenue, to increase trade by securing a market for a defined period (as is done to this day by issuing patents).

All these grants of monopolies were not wholly bad; in fact many were very good. "In return for the many privileges extended to it, industry was expected to maintain a high standard of production. The statute book was full of laws prescribing the materials to be used and the processes to be employed in particular trades . . . producers in return for protection from the the State must supply the public with a

genuine article" (Birnie: "An economic History of the British Isles"). Therefore, when we come to deal with the question of monopolies in this twentieth century, due regard must be paid to the advantages as well as to the disadvantages of arranging trade on an orderly basis.

There is much to be learnt from American experience over the past 60 years. It is not denied that at times monopolies in that country, and in some cases international cartels, could and did operate to provide vast fortunes at the expense of the public. The well-known "corners" in vital commodities could not be defended on any grounds of public policy. After years of legislation, came the now famous "rule of reason" which was described by a dissenting judge as "allowing reasonable restraint of inter-State commerce instead of prohibiting all restraints."

In 1920, the American Courts ruled against the compulsory dissolution of the U.S. Steel Corporation, even though the immensity of that concern conferred upon it monopolistic powers, on the ground that its dissolution would create a risk of injury to the public interest. "Open price associations" are allowed in the U.S.A., enabling members to report sales and prices to each other through a central body. There is a growing realisation there, given legal force through the Clayton and Federal Trade Commission Acts, that competition may be undesirable in some circumstances. In Great Britain the Socialist Government has endorsed that view by setting up huge monopolies

## On Other Pages

### Leader :

Monopolies ... .. 637

### Notes and Comments :

Great Expectations ... .. 639

Experts ... .. 639

Nationalisation ... .. 639

In Custody ... .. 640

U.S. Chemical Patents for Sale ... 640

"Bridging the Gap" ... .. 641

Price Reductions Announced ... 641

I.C.I. Gains Liverpool Sites ... 641

Electron Microscopy Studies ... 641

Chemistry as a Career ... .. 642

Marshall Aid Proposals ... .. 643

Wax and Benzol ... .. 644

New Fertiliser ... .. 644

Nazis Looted Heavy Water ... 644

U.S. Lead Boom ... .. 644

Remote-Control Manipulator ... 645

Wide Scope for Titanium ... .. 646

Buyers Delegation Welcomed ... 649

The B.I.F. in Pictures ... .. 650

Chemical Equipment at Birmingham 654

High Vacuum Equipment ... .. 657

The Gas Turbine ... .. 657

American Chemical Notebook ... 658

Parliamentary Topics ... .. 660

Official Notices ... .. 660

Dust Explosions ... .. 664

Letter to the Editor ... .. 664

to operate in coal, electricity, transport, aviation, and now in gas. These monopolies are kept outside the scope of the new Bill, but they are safeguarded by Consumers' Councils, and by direct control by the Minister who can terminate immediately any undesirable practices.

"The purpose of the Bill, says the explanatory memorandum issued with it, "is to provide for investigation of monopolies and restrictive arrangements in industry and trade, and to give the Government special powers for dealing with those which are found to work against the public interest." That is apparently innocuous, but in reality it confers extraordinarily wide powers. Who is to decide whether any particular practice works against the public interest? Any type of price control, any method of ensuring that orders go round without spending unnecessary sums on publicity and sales might be regarded in that light. But in fact, when there is not enough work for everyone, some arrangement of this sort is essential if commercial life is not to degenerate into a Dutch auction. It is to no one's advantage, least of all the consumer's or the nation's if firms compete to lower prices below the cost of production in order to keep their works open. Ultimately, many such firms must go out of business, and the country is the poorer, possibly permanently so.

Businesses must make profits or they

cannot finance research, nor can they undertake to develop new processes or provide modern works and equipment. It is fairly certain that nearly all arrangements that have been made to fix prices or to share markets operate in order to preserve equilibrium. If prices are fixed at such levels as to keep inefficient firms in being without any need for them to modernise then the practice is bad. But if reasonable prices are fixed which allow a reasonably efficient firm to operate at a moderate profit and a good firm to operate at a higher one, the arrangement is good.

It is perhaps a mitigating circumstance that the Commission to be set up is of the semi-permanent type. We trust that it will be composed mainly of men with experience of business and of commercial law. It appears likely that there will grow up from its deliberations a mass of what for better name may be termed "case law," in which it will slowly appear what principles are to be adopted in investigating cases and in deciding what is "contrary to the public interest." The whole problem bristles with difficulties, and real national harm can be done by faulty decisions. It is not without significance that the U.S.A., having spent 60 years in developing such a series of decisions to constitute its "case law," has not yet arrived at a final code, and tends to relax restrictions rather than to tighten them.

## NOTES AND COMMENTS

### Great Expectations

**P**RIVILEGED to be the first to see what new products have been prepared by British industry since May, 1947, buyers travelled in force on Monday to the three centres of the British Industries Fair. None showed any sign of regretting that he made the journey, despite the fact that in many cases the point of departure was half the world away. Perhaps the most marked of incidental impressions of the Fair in London was the frequency with which on Monday one heard English spoken in accents which proclaimed a remoter origin than the English provinces. Having in mind the current and future importance of the markets of which such visitors were the emissaries, the unfamiliar English seemed like a portent of the better economic and other relationships which we are seeking. As always, the scientific and chemical sections in London appear to have contributed more than a proportional share in attracting overseas buyers. Some of these no doubt came chiefly in search of information; if so they were amply rewarded in the chemical and scientific instrument sections at Olympia and by the new applications of plastics at Earls Court. Many who came to quiz must have remained to buy. Order books were in fact in evidence within an hour of the opening of the Fair and, while this cannot be taken as assurance that the big orders placed last year will again be forthcoming, there is no doubt that the progress in the evolution of new materials and new applications has merited that result.

### Experts

**T**HE sections of the B.I.F. in which THE CHEMICAL AGE is concerned provided model examples of the enlightened business methods which it is agreed are essential to the establishment of fruitful relationships with foreign markets. The criticism frequently heard that British trade envoys are too often not fully equipped linguistically or, what is worse, with the technical information required by foreign buyers, cannot be directed at the chemical or scientific instrument industries. On many of these stands it seemed

that scientists and technicians had been mustered on a scale appropriate to a scientific convention, so that few will have been deterred from buying by lack of technical information. Early reports go to show that unwillingness to place orders for British chemicals and equipment is not likely to be an impediment to the large increase in foreign business which is in view. Far more common and less easily disposed of is the uncertainty associated with international trading arrangements. The problem exercising the minds of many foreign buyers at the moment is not whether or not to place an order but whether such an order will be eligible for an import licence.

### Nationalisation

**T**HE confident prediction arising out of the Labour Party conference that next on the list for nationalisation are the chemical and engineering industries has provoked — or emboldened — one more highly placed in prevailing authority to give a "ruling" on the subject. This comes, rather oddly, from the Secretary of State for War and seems to indicate that the former Minister of Fuel has not forgotten that there have been occasions when his most confident predictions were ludicrously wide of the mark. Those who heard Mr. Shinwell at the opening of the Co-operative congress in Edinburgh last week-end must have been astonished by his uncharacteristic admission: "When the mining industry was nationalised — this had been on the Labour Party programme for 50 years — we thought we knew all about it: the fact of the matter was we did not." Extraordinary difficulties had been met in preparing legislation, and in the administration of the mines by a public board still more were coming to light. The underlying difficulty of all such schemes was that this was not "a really social democratic country." Such difficulties, he admitted, were capable of destroying the whole conception and making it impossible to proceed further with nationalisation. In Edinburgh on Monday, the War Minister had recovered his spirits, and recalled perhaps what tradition says is the best form of defence. "If our opponents imagine that, because

of certain defects which will be dealt with, we are not going to push ahead with nationalisation in other directions, they are barking up the wrong tree," he declared. "We shall never be satisfied until we have nationalised all major industries of the country and, in addition, until we have introduced the right democratic content into nationalised industries."

### In Custody

**A** WELCOME contrast with the indecisive procedure which has characterised the breaking down of some of Germany's great chemical production system to provide reparations is an intimation just issued by the Board of Trade on behalf of the Custodian of Enemy Property in England. Tenders are invited for the purchase of holdings totalling 52,000 £1 ordinary shares in three undertakings, of which the largest is the interest in Bayer Products, Ltd., Africa House, Kingsway, London, W.C., the English section of the great pharmaceutical combine, which is

stated to have a nominal and issued capital of 80,000 £1 shares, of which 40,000 are now being offered for sale. Next on the list, and in importance, is the offer of 11,666 ordinary shares of £1 in the British Flottmann Drill Co., Ltd., colliery and drilling equipment makers, of The Heath, Cardiff; and also to be made available are 500 £1 ordinary shares in the Electrode Welding Co., Ltd., of Jubilee Works, Colbold Road, Willesden, London, N.W.10. About the tenders, which must be in the hands of the Controller General of the department for the Administration of Enemy Property by the morning of June 4, the Board attaches a note, which, in the light of recent events in the sphere of domestic policy, is capable of more than one construction. "In accepting any tender," says the Board, "and directing the Custodian of Enemy Property in England to effect the sale, the Board will be guided by the national interests." It would be interesting to know whose tenders, besides those of foreign nationals, are liable to be debarred.

## U.S. CHEMICAL PATENTS FOR SALE

**T**EN patents relating to chemical processes were made available for licencing or sale by Mr. Walter G. Berl, 529 Dale Drive, Silver Springs, Maryland, according to an announcement made by the U.S. Patent Office. The patents are:

Patent No. 2,039,290 covering production of highly acetylated cellulose acetates by circulating an excess of acetic acid over a mass of cellulose held stationary on a perforated base, after which benzene is used to remove most of the acetic acid.

Patent No. 2,040,971 relating to cellulose ester composition.

Patent No. 2,084,833 covering a process for the manufacture of highly acetylated cellulose acetates. Cellulose is hydrolysed with glacial acetic acid which contains small amounts of a catalyst such as sulphuric acid not at the usual temperatures of 60 to 70°C., but at lower temperatures which do not exceed 30°C.

Patent No. 2,110,642 embraces a two-stage process for the manufacture of cellulose esters in which esterification in suspension of pre-treated cellulosic material proceeds more smoothly and with less undesirable heat than formerly, and in

which the esters obtained are uniform and possess valuable properties.

Patent No. 2,121,899 is concerned with the treatment of cellulose tri-acetate which is rendered soluble in acetone by treating it at a raised temperature with a substantial quantity of an alcohol in the presence of a small amount of phosphoric or sulphuric acid.

Patent No. 2,122,448 covers a process for the manufacture of products made from cellulose derivatives such as threads, filaments, ribbons, films, etc.

Patent No. 2,125,880 relates to the manufacture of mixed aliphato-nitro cellulose and products thereof.

Patent No. 2,175,103 embraces the manufacture of cellulose esters and includes methods of obtaining a partially esterified cellulose mixed ester of good quality from a tri-substituted cellulose acetate.

Patent No. 2,346,350 is concerned with the production of highly substituted acetone-soluble cellulose acetate.

Patent No. 2,384,415 deals with continuous production and stabilisation of nitrates of cellulose, or nitrates of other alcohols. With this process, nitration and stabilisation may be speeded up.

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## "Bridging the Gap"

### University Professors Visit Steel Industry

THE United Steel Companies, Ltd., recently invited 14 professors of Mechanical Engineering from 11 different universities to visit its works in Sheffield and Scunthorpe. The visit, which lasted four days, was designed to help bridge the gap between industry and the universities by giving university men an opportunity of seeing the special problems of the steel industry and the steel men the chance of discussing with the professors the latest engineering developments.

Discussions were arranged on the dependence of metallurgical developments on engineering research, with particular reference to such problems as the handling of scrap and the flow of gases in open hearth furnaces. A discussion on industrial research was opened by Sir Charles Goodeve, director of the British Iron and Steel Research Association.

The professors, who were received by Mr. Gerald Steel, the joint managing director, were:

G. F. Mucklow and T. U. Matthew, Birmingham; A. Robertson and J. L. Morrison, Bristol; A. F. Burstall, Durham; R. N. Arnold, Edinburgh; G. Cook, Glasgow University; A. S. T. Thomson, Glasgow Royal Technical College; N. J. Kearton, Liverpool; E. Giffin, London; H. Wright Baker, Manchester; C. H. Bulleid, Nottingham; H. W. Swift, Sheffield; Cave-Browne-Cave, Southampton.

## ELECTRON MICROSCOPY STUDIES

BY courtesy of Prof. Sir Lawrence Bragg a Summer School in Electron Microscopy will be held in the Cavendish Laboratory from August 18-24 inclusive.

The school will provide a grounding in the theory and applications of the electron microscope, and is intended for those who already have some familiarity with the instrument. The lectures will deal with the fundamental theory and operating principles of the electron microscope. The various techniques of specimen preparation will be demonstrated, and practised in small groups by the class. The three leading models of instrument will be used, and discussions held on their special characteristics.

A detailed syllabus and form of application for admission may be obtained from Mr. G. F. Hickson, secretary of the Board of Extra-Mural Studies, Stuart House, Cambridge, to whom the completed application form should be returned not later than June 12.

## Price Reductions Announced

### I.C.I. and Joseph Crosfield

IN accordance with the Chancellor of the Exchequer's recent letter to the Federation of British Industries and similar employers' organisations, Imperial Chemical Industries, Ltd., has decided to reduce prices over a wide range of products. The effect of this decision, states the company, will be to save the customers of I.C.I. more than £1 million during the next twelve months.

In some instances, this voluntary reduction will be expressed by specific price decreases; in others, it will take the form of a special percentage reduction covering certain ranges of goods. The company states that it is endeavouring to stabilise prices as far as possible, but heavy increases in the costs of raw materials or services may compel alterations. Details of the price changes will be made known as soon as possible.

### Cheaper Alkaline Products

A similar announcement was issued on Monday by Joseph Crosfield & Sons, an associate of Lever Brothers & Unilever, Ltd. The company announced that it was making a reduction of 1½ per cent on the invoice value of alkaline chemical products used in industry as raw materials. This reduction took effect at once.

The chemicals concerned are: caustic soda, sodium silicate, potassium silicate, sodium metasilicate and specialised alkaline detergent products sold for industrial cleaning.

## I.C.I. GAINS LIVERPOOL SITES

NEGOTIATIONS by Imperial Chemical Industries, Ltd., for the acquisition from Liverpool Corporation of an important 50-acre site at Kirkby for a non-ferrous metals plant have reached the final stage, and may be completed shortly. The way will then be open to proceed with the first stage of a major development programme requiring approximately two years to complete.

The company has an option on an adjoining 50 acres which form part of the 4000-acre estate at Kirkby that the Liverpool Corporation is buying from the Earl of Sefton for £375,000. The Finance Committee of the Corporation agrees to transfer to I.C.I., on lease for 999 years, 50 acres fronting the East Lancashire Road, within half-a-mile of the junction with King's Drive, at a peppercorn rental, for £75,000. The company would pay a further £7500 for a ten-year option on the other 50 acres.

# Chemistry as a Career

## Scientists' Advice to Scottish Students

**P**ROF. W. M. Cumming, of the Royal Technical College, Glasgow, and Dr. W. J. Jenkins, managing director, Explosives Division, ICI, on April 26 gave the first of a series of advisory talks to secondary school pupils arranged by the Glasgow Careers Council. Both speakers dealt with the prospects awaiting juniors entering the chemical industry.

Prof. Cumming began by saying that his object was not to advocate chemistry and chemical research as a profession, but to explain the scientific aspects of the work and leave the decision entirely to his audience.

Emphasising that at the present time this country needed research workers more than ever before, the speaker pointed out that research began with a plan, based on factual knowledge, and that the worker needed to have a sufficient grounding in the subject which he was investigating.

### Aids to Research Students

After differentiating between the academic nature of pure science and science applied in industry, Prof. Cumming encouraged prospective research workers by pointing out that although they had perhaps a longer period of study than students in various other fields, there were several bursaries, grants and similar provisions in the later stages which would enable them to carry their own expenses without any burden falling on parents.

He emphasised that it was not everyone who could take up research, and added that he could give no great inducement as to salaries, but prospects were good. "I have 28 students finishing in June," he said, "all with honours degrees, and each one leaving has at the moment six or seven jobs in his pocket now."

### "Team Spirit"

Dr. Jenkins said that a boy entering industrial chemistry or research would be well advised to have a feeling of team spirit, because in the big firms in the chemical industry team work prevailed. The student who wanted to work in industry during the day and study for his degree at evening classes must understand that he was in for a hard time. Many firms, however, understood the problems of working and studying, and some were prepared to give one day off each week for scholastic purposes. Such a course was far harder than going to the university to take a degree, but it had the advantage of being

cheaper. Glasgow University, on the other hand, had a large range of bursaries so that there was help for those who wanted to devote their whole time to science. Students chemists entering industry would probably spend a year or two in the research department to obtain fundamental training and would then be expected to make up their minds as to which branch they particularly wished to study.

One pupil asked whether the university student or the boy who entered industry and studied in his spare time had the better chance for progress. Dr. Jenkins said that the easiest and safest method was to go to the university and then enter industry, but there was no hard and fast rule about it.

### 10th ANNIVERSARY MEETING

**T**HE work of the chemist in research, industry and public services was the subject of an exhibition opened to the public, forming part of the 10th anniversary celebrations of the Royal Institute of Chemistry which has just ended in Birmingham (THE CHEMICAL AGE, May 1).

Following the adoption of the accounts and report of the council, Dr. G. Roche Lynch, the president, moved two resolutions, which were passed. One authorised the submission to the Privy Council of a petition for a new charter for the Institute; the other, as from January 1, 1948, raised the annual subscription of Fellows to three guineas, and of Associates to two guineas. It was also agreed that the subscription for Associates under 25 years of age on January 1 in any year, should remain at 1½ guineas.

### Appointment of Officers

Officers appointed for the 1948-49 session are as follows:—

President: Dr. G. Roche Lynch; vice-presidents: Dr. H. V. A. Briscoe, Dr. F. Challenger; Mr. G. E. Dodds, Dr. A. Findlay, Mr. E. T. Osborne, and Mr. A. J. Prince; hon. treasurer: Dr. D. W. Kent Jones.

**Few Women Workers.**—The chemical industry in Scotland is still experiencing an acute shortage of women workers and has no immediate prospect of reaching the desired production level unless there is a considerably increased flow of labour. This point was emphasised in Edinburgh last week by the North British Rubber Co., Ltd.

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# MARSHALL AID PROPOSALS

## Europe to Provide Half its Chemical Requirements

**A**TENTATIVE programme presented to the U.S. Congress last week by Mr. Paul G. Hoffman, Economic Co-operation Administrator, shows that of the \$5300 million authorised for the first year of the programme, the U.K. is to receive \$1324 million. Emphasis is laid on "self-help," which in the case of requirements of chemicals and fertilisers is estimated at about 50 per cent.

### Chemicals

In the chemical field, Western Europe will supply about half its requirements in 1949. Total imports of \$763.8 million will be satisfied by \$362.6 million supplied by the ECA countries themselves; about \$200 million from the U.S.A., \$55 million from Canada, \$62 million from non-participating nations other than South America, while the latter will supply some \$3 million worth. ECA nations also will export \$872.5 million of chemicals, including \$344.6 million circulated among themselves, \$286.7 million to non-participating countries except South America, which will receive \$58.2 million, while the U.S.A. will import \$60 million, and Canada \$8.5 million worth.

### Fertilisers

Of the 418,000 tons of nitrogen needed, Western Europe will supply 216,000 tons through intra-European trade, South America 110,000 tons, and 70,000 tons from the U.S.A. Imports of 443,000 tons of soluble phosphates include 348,000 traded among themselves and 98,000 from non-participating countries; 83,000 tons of phosphate rock will be sent by the U.S.A., and 33,000 tons by non-participating countries. Potash imports will total 800,000 tons, including 195,000 tons traded among themselves and 600,000 tons from non-participating countries.

### Non-Ferrous Metals

Of non-ferrous metals, in the 15-month period the U.S.A. will ship 73,000 metric tons, Canada will send 75,000 tons and other Western hemisphere countries 224,000 tons. While the U.S.A. will ship no tin, Canada will send 22,500 tons to the U.K., and other Western hemisphere countries will ship another 5000 to U.K. dependencies. Lead amounting to 28,000 tons will be exported by the U.S.A., 63,000 tons by Canada, and 96,000 tons by other Western hemisphere countries. Zinc totalling 55,000 tons will be sent by the U.S.A., 98,000 tons by Canada and 147,000 tons by other Western hemisphere countries. While no aluminium will be sent by Canada or other Western

hemisphere countries, the U.S.A. will ship 209,000 tons.

### Petroleum

The U.S.A. will send 27½ million tons of petroleum in the 15-month period. None will be shipped by other Western hemisphere countries. Of this amount the U.K. will get 6.5 million, German Bizone 1.02 million and the U.K. dependencies 7.06 million. An additional 32.22 million metric tons of oil will come from other non-participating countries outside the Western hemisphere.

### Coal

During April-June, 1948, the U.S.A. will send 6.21 million tons of coal to Europe and dependencies of participating countries, and in the year ending June 30, 1949, 30.136 million metric tons of coal will be sent by the U.S.A. This is the U.S.A.'s share of the total coal requirements (110.861 million tons) of the 16 nations for the 15-month period. None of this coal is destined for the U.K.

### Private Trade Channels

Mr. Paul G. Hoffman, Economic Co-operation Administrator, in explaining how ERP commodities are to be obtained, said that private trade channels would be used as much as possible, that the ECA will be the watchdog and banker of the programme, rather than the buyer, and that in the beginning some Government procurement will be necessary.

Outlining the way procurement will operate, Mr. Hoffman said that participating nations will submit overall schedules of their requirements through their permanent joint agency in Paris, the Organisation for European Economic Co-operation. The schedules will be reviewed in Washington by ECA and revisions will be made "where necessary to prevent undue impact upon our economy and to make certain that ECA funds are conserved and spent only for those supplies which will contribute most to economic recovery and reconstruction."

Mr. Hoffman said that "the countries involved, either through their governments or private business firms, will then be free to make such arrangements as they desire with private American exporters and manufacturers. American firms make their own contacts with European purchasers. While normal payments for legitimate services in connection with procurement are permitted, the ECA and other government agencies will seek to prevent foreign purchasers from paying unnecessary or exorbitant fees or commissions."

## Wax and Benzol

### U.S.A. Announces Export Quota

THE U.S. Office of International Trade this week announced that paraffin wax brokers and manufacturers may export 11 million lb. of refined wax in the second quarter and also announced export allocations for the same period for benzol, naphthalene and phenol. The amount of wax due to be exported was decided following a compromise between the OIT and the Department of Agriculture. The latter had urged that the quota should be sharply reduced to provide more of this wax for food preservation purposes in the United States. The OIT had originally called for an even larger export quota than was finally agreed. Refined wax was defined as pure white wax with less than  $\frac{1}{2}$  per cent oil and moisture, and with no odour or taste.

Among the export allocations for phenol are the following: United Kingdom, 3 million gallons (50 per cent of the total authorised allocation); 560,000 to Luxembourg; 500,000 to The Netherlands; 300,000 to France; 10,000 to Australia; 16,000 to New Zealand; and 10,000 to the Union of South Africa. Benzol allocations total 1 million gallons.

## NEW FERTILISER

AN appropriation Bill recently before the U.S. Congress contained an item proposing the expenditure of \$45,000 on the construction of a pilot plant for the experimental production of Uraform, a new nitrogen fertiliser developed by chemists of the U.S. Department of Agriculture. The new material, which is described as a slowly soluble, non-leaching fertiliser made from urea and formaldehyde, is also said to be valuable as a conditioner of fertiliser mixtures, as it is unaffected by moisture adsorption.

Originally announced in April, 1947, it has since been developed. Sufficient production for more extensive experiments, however, can be achieved only if the appropriation is sanctioned.

## Nazis Looted Heavy Water

The Norwegian Government's Directorate for Enemy Property has made application to the U.S. occupation authorities in Germany for the return of eight flasks of "heavy water," removed by Nazi scientists in Norway shortly before the German capitulation in 1945. The flasks, each containing about 21 pints, are in American custody.

## U.S. Lead Boom

### Big Supplies Make Record Prices

EXTRAORDINARY consumer demand resulting in record prices was one of the principal factors producing the very large increase in U.S. lead production in 1947. This, the comparatively favourable labour position and the tightening of reconversion problems, such as burdened the lead industry in 1946, were chiefly responsible for increases of 12 per cent in mine output of recoverable lead, of 40 per cent in smelter production of refined lead, and of 26 per cent in recovery of lead from secondary sources, according to the U.S. Bureau of Mines. The increased supply, however, was quickly absorbed by consumers for current needs and by accumulations of civilian orders held over during the war. Meanwhile the record high price of 17.5 per cent per lb. established about two weeks ago has served to attract large tonnages of foreign lead to the U.S.A., particularly from Australia, whose lead producers have already sold about 25,000 tons of refined metal to U.S. industrial users at 17.5 cents including the 1 1/16 cents a lb. import duty.

### More from Australia

At the same time it is worth noting that increased exports of minerals to the U.S.A. have been recommended to the Australian Government as a means of earning dollars. Two recommended methods by which this may be accomplished are: (1) increased production of lead, zinc, silver, iron and steel, all of which are now important items of export; (2) increased output of manufactured products from Australia's own raw materials. This year, it is estimated, the U.S.A. will receive from Australia lead worth about \$10 million—four times the value of lead exports to America last year. Shipments of silver-lead concentrates to the U.S.A. this financial year will exceed \$3 million.

### U.S. Production

In 1947 refined lead made available to consumers in the U.S.A. totalled approximately 714,330 tons, 50 per cent more than in 1946. Total mine production of recoverable lead (including that made into pigments) was 375,267 short tons. It is estimated that 486,000 tons of refined lead and 88,000 tons of antimonial lead were produced at primary refineries in 1947, increases of 40 and 76 per cent respectively over 1946.

**China's Tung Oil Prospects.**—China's tung oil output for the current year is estimated at 80,000 tons, of which 70,000 will be shipped abroad. The main producing centre is Szechuan.



# REMOTE-CONTROL MANIPULATOR

## Mechanical Hands to Perform Dangerous Tasks

**M**ECHANICAL "hands," which in dangerous areas can perform delicate chemical experiments, operate machine tools, and do countless other tasks requiring great dexterity while the operator sits screened by a lead-insulated wall, have been demonstrated for the first time at the Hotel Pennsylvania, New York, by scientists of the General Electric Co..

The "hands," which are known as the remote-controlled manipulator, the principal part of the device, also proved they could perform such common jobs as slicing an orange, pouring liquids from one receptacle to another, and lighting a cigarette

The "hands," designed by Mr. J. Payne, of the Knolls Atomic Power Laboratory, are similar to the double hooks used by an actor in the film "The Best Years of Our Lives." They are at the lower ends of two arms which descend vertically from two horizontal shafts 8 ft. high across the top of the wall. From these come down vertical arms which are controlled by the operator with handles. The operator views his mechanical hands, 8 ft. away, with binoculars and a four-mirror periscope which looks over the lead-insulated wall. His feet are on pedals which control the grasping action.

The general motion of the hooks corresponds to that given the handles, as they are moved up or down, forwards or backwards, or from side to side. The handles can be turned around three axes, by wrist movement, and the hooks do likewise. While most of the connections between handles and hooks are mechanical, the twisting of

the wrists is accomplished electrically. This permits the artificial hands to do something real ones cannot. They can be revolved any number of times. There are various sizes of interchangeable "hands" and one is provided, instead of hooks, with a pair of snips for cutting sheet metal

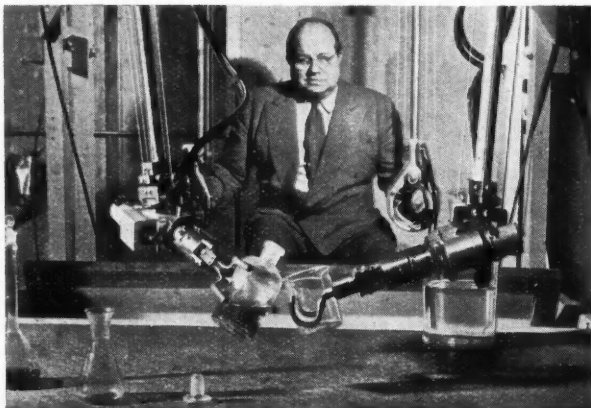
In describing the manipulator, Mr. Payne pointed out that he made every effort to ensure that the motions were as natural as possible. Without practice it is not difficult to perform a simple operation such as removing the stopper from a bottle and pouring its contents into another. With practice much more complicated things can be done, such as writing and operating a drill press.

## NEW PRESSURE REGULATOR

**A** NEW type of automatic pressure regulator, operating on the physical principle of the Cartesian Diver, a method new to industry, has recently been developed and is now being manufactured by the Emil Griener Company, 161 Sixth Avenue, New York City. Entirely automatic, the new Industrial Cartesian Manostat, Model 5, requires no complex electrical or mechanical systems or extra equipment and is expected to find application in the food and petroleum industries, gas absorption, distillation and evaporation. Completely self-contained, the unit can be installed in any existing system, and set to maintain the desired pressure vacuum.



The inventor demonstrates a few of the operations which can be performed by use of hand and foot controls without exposing the operator to the effects of explosive, toxic or radioactive potentialities of the material being used. A high degree of dexterity is possible, such as lighting a cigarette or writing legibly



# Wide Scope for Titanium

## Review of Important Research in Australia

ONE of the most practical and comprehensive surveys of the characteristics and potentially wide uses of some titanium materials was provided by Mr. F. K. McTaggart, one of the officers of the Industrial Chemistry Division of the Australian Council for Scientific and Industrial Research before the London Section of the Oil and Colour Chemists' Association. The speaker, who is a member of the association's Australian section, reviewed principally butyl titanate used as a new paint vehicle and later dealt with titanium-modified oils and phenolic resins, illustrating incidentally the important progress in application research which is being made in Australia.

### Mineral Beach Sands

One of the major projects of the Minerals Utilisation Section of the Australian CSIR, he said, was concerned with the development of uses for the heavy mineral beach sands found at Byron Bay and elsewhere on the north-eastern coast of Australia. Those sands occurred as extensive stratified lenses interbedded with the normal quartz beach, sand. Their preliminary natural concentration was due to wave action, causing differential segregation based on their high specific gravity. The heavy minerals consisted chiefly of zircon, rutile and ilmenite, with small amounts of monazite containing cerium, thorium and the rare earths.

The very extensive deposits formed one of the world's richest sources of zirconium and titanium, and were a stimulating challenge to the chemists and technologists of Australia.

A comprehensive investigation of the products to be obtained from those minerals had been in progress for a considerable time. In the course of it various esters of titanium, such as ethyl titanate, butyl titanate, amyl titanate, phenyl titanate and cresyl titanate of the general formula  $(RO)_4Ti$ , were prepared.

It was noticed that when those compounds were spread out and allowed to dry, films were formed which, although brittle, were thought to have a possible value in surface coatings. For more than 15 years an analogous compound, ethyl silicate, had been recommended as a basis for paints for stonework and similar materials. That coating had never been very popular, however, possibly because of its poor adhesion and small resistance to mechanical shock.

The properties of paint films based on butyl titanate pigmented with titanium oxide and mica seemed worthy of investigation. Butyl titanate was used in preference to ethyl titanate because it was easier to prepare and had less tendency to hydrolyse.

Formulations similar to those frequently used in paints based on ethyl silicate were selected first. A typical formulation was:—

Butyl titanate	100	parts by weight
Ethyl alcohol	30	" " "
Mica (dry ground)	30	" " "
Titanium dioxide	30	" " "

Because of the many possible variables the investigation was limited in scope, but the following formula was found to give a paint of exceptional properties:—

30	parts by weight	aluminium flake xx fine
50	" " "	butyl titanate,
5	" " "	glyptal resin, e.g.,
		Beckosol 1323.
15	" " "	butyl alcohol.

No water was necessary with that formulation, but up to 3 parts by weight might be added without apparent effect on the stability. The can stability of the paint was quite satisfactory. Samples had been stored for over eight months and no gelling had occurred. In that respect the titanate paints differed from those employing ethyl silicate. The formulation quoted might be diluted by any of the usual solvents and the paint could be sprayed or brushed.

### High Heat Resistance

Films on mild steel would withstand temperatures up to 500°C. for prolonged periods; after exposure to high temperatures they became extremely hard and adherent that their removal was not possible without injury to the underlying steel.

The corrosion protective properties of the air-dried film were poor, but after heating to between 200° and 300° the film was considerably improved in that respect. The heating might be done in an oven, but the use of a blowlamp directly over the painted surface was equally effective. The heating should be continued until the film, which rapidly became discoloured, had reverted to its original bright appearance.

Such a coating was very resistant to thermal shock. In one series of tests, panels were thrice heated to 600°C and immediately quenched in cold water without showing any effect. Other panels painted

with that formulation were dried at 200° and partially immersed in sea water. After six months no visible attack on the metal could be noticed.

Large-scale trials were also being made and the results showed that as a protective coating for steel under high-temperature conditions, the butyl titanate paints were superior to conventional heat-resisting paints.

In one series of tests, mild steel panels coated with the butyl titanate aluminium paint and stoved with a blow torch were suspended in the flues of the Dwight Lloyd reheaters. The flue gases, at a temperature of 200°C., contained up to 5 per cent of sulphur dioxide and a considerable amount of water vapour and consequently were very corrosive. After four months' exposure the panels were slightly discoloured, but otherwise unaffected. The tests were being continued.

### Polymerised Butyl Titanate

An extremely fertile field was that connected with polymerised butyl titanate. The work described so far was associated primarily with butyl titanate in an unpolymerised form. Preliminary work on the formulation of paints with polymerised butyl titanate suggested that interesting surface coatings might be made with that material.

The preparation of butyl titanate involved the reaction of butyl alcohol with titanium tetrachloride and the subsequent removal of hydrogen chloride by a base such as ammonia. A pilot plant had been erected, consisting of a 40-gallon mild steel reaction pot provided with a motor-driven stirrer, a jacket which could be used for steam heating or cooling, and suitable charging connections for alcohol, ammonia and titanium tetrachloride.

To minimise the formation of viscous products as well as to ensure sufficient absorption of ammonia, the reaction mixture was cooled to approximately 10° C. by circulating ice water through the jacket of the vessel. After completion of the reaction, the ammonium chloride formed was removed by the use of a vertical type pressure filter.

The author described the operation for a typical batch, and said that after several batches had been prepared the reaction pot was used for the concentration of butyl titanate solution by distillation of the excess butyl alcohol. The product was a light brown, mobile liquid which contained less than 0.2 per cent chloride and approximately 80 per cent butyl titanate. The cost of raw materials for the production of 1 lb of butyl titanate was approximately 2s. 6d.

The second part of the paper dealt with titanium-modified oils and phenolic resins.

The esters of titanate acid with lower alcohols provided a convenient starting point for the preparation of more complex esters by means of an ester interchange. Using that type of reaction, the preparation of titanate acid esters with unsaturated alcohols had been suggested and it had been claimed that those esters yielded on polymerisation hard resinous materials. Gardner had reacted ethyl titanate with glycerol, and the reaction product had formed a stable glycerogel. Films from that gel had been reported.

The formation of glycerol esters also had now been further investigated, using butyl titanate as the starting material, and several compounds had been prepared, each having different physical properties.

In regard to the oil-modified titanium glycerides, preliminary experiments had shown that esterification of linseed oil fatty acids with previously formed solid glycerol titanate yielded oils having good drying properties; but since the reaction required prolonged heating, the materials were invariably dark in colour. If, however, the glycerol were first reacted with the oil, forming di- and monoglycerides, and then the ester interchange with butyl titanate carried out, a product of much paler colour was obtained. A large number of experiments were carried out, using various temperatures and reaction times, but in none of them was it possible to complete the reaction. The maximum amount of butyl alcohol that could be driven off was approximately 85 per cent of the theoretical.

### Alkyd Resins

The speaker went on to discuss the alkyd resins and the attempts which had been made to introduce titanium glycerides into an oil-modified phthalic acid-glycerol resin. After describing an experiment in which the reaction was carried out, the author said the viscosity of the titanium-containing resin was 1.6 poises, whereas the viscosity of the resin without the titanium was 5 poises. There was no appreciable difference in the drying time of the resins, but after 24 hours' drying the film of the titanium-containing resin was noticeably harder.

Castor oil titanates were next discussed. Castor oil, having three free hydroxyl groups per molecule, could be esterified without the introduction of alcohols. A number of esters were made, using butyl titanate as the reagent. The author described a typical experiment, the reaction product from which was a pale brown oil. It did not show any tendency to gel on storage and was compatible with nitrocellulose, whereas when butyl titanate was added to nitrocellulose solution, gelation occurred very rapidly.

Exposure tests on a nitrocellulose lacquer

plasticised with the castor oil-titanium ester showed that after six months' exposure the titanium containing film appeared unaltered, whereas the comparison film showed signs of cracking and was very brittle. From the experiments it appeared that the use of titanium-castor oil esters as plasticisers for nitrocellulose lacquers had distinct advantages over castor oil, since the hardness and toughness of the film was increased and the durability improved.

It was of interest that in patents granted to the Dupont de Nemours Company, titanium salts of organic acids were suggested for use in nitrocellulose lacquers in order to improve their durability.

The ester interchange between butyl titanate and castor oil could not be carried to completion by mere heating of the reaction mixture. As a result of further experiments, however, it was found that if superheated steam were passed through the reaction mixture at 200° C., the theoretical amount of butyl alcohol could be driven off. Castor oil esters with various acids had been in use for a considerable time for the production of dehydrated castor oil.

#### Modified Resins

Finally, the author dealt with titanium-modified phenol formaldehyde resins. Aryl esters appeared to be of special interest, since their constitution suggested that they would undergo condensation with formaldehyde. The esters used in the work described were made directly from titanium tetrachloride, but they could be prepared, possibly with advantage, by an ester interchange with a simple alkyl ester.

When 1 mol. of phenyl titanate and 4 mols. of formaldehyde were refluxed in butanol for 15 minutes, a viscous red-brown liquid remained after partial removal of the butanol by evaporation. Films of that material dried on exposure and were transparent, glossy and brittle.

Formaldehyde was also reacted with *o*-, *m*-, and *p*-cresyl-titanate, and the condensation did not present any difficulties. The reaction products of the three isomers appeared to have similar properties, which would indicate that even *o*- and *p*-cresyl-titanates readily formed cross-linked polymers.

The uncured resins were compatible with the usual plasticisers and might be incorporated into drying oils to form varnishes. The resins cured by further heating were hard and brittle. Paints and varnishes made from the resins appeared to have good water and alkali resistance, and withstood elevated temperatures well. Outside exposure tests had so far not been carried out. The main

disadvantage of the resins was their dark colour.

The work carried out so far on that type of reaction was of a preliminary nature only but it had shown that the introduction of titanium into the complex of a phenol formaldehyde type of resin presented no difficulties. It was likely that certain advantages might be gained in surface coating made from titanium-containing resins, such as improved heat resistance and outdoor durability. More work was required, however, before definite conclusions could be reached.

#### Discussion

In the course of discussion which followed the paper, Dr. R. F. Bowles said that, starting from titanium tetrachloride or some of the esters, it appeared possible to make compounds resembling the silicones, but having even better properties. He asked whether work on those lines had been done. Mr. McTaggart said that it had; the work he had described had arisen out of attempts to form such compounds. The work on the esters had arisen out of their use in Grignard reagents, in the attempt to form alkyl titanium compounds. Work was progressing, using some of the later methods which had been applied to form the corresponding silicon compounds. Both from the work in Australia and in America it appeared that one could not obtain the carbon-titanium linkage by using the Grignard reagents; but he still felt it would be possible to do so by using some other method.

Mr. P. J. Gay said the author had given what appeared to be another page in the story of the inorganic organic materials, and it was suggested that much more had yet to be discovered about them. He mentioned, for example, the silicon organic materials in which the silicon seemed to have an extraordinary effect over the carbon atom in its vicinity; and the tin organic compounds which in quite small quantity had an outstanding stabilising effect on polyvinyl chloride, and so on. The titanium materials appeared to lend themselves particularly to investigation.

Mr. McTaggart agreed that the possibilities were quite staggering. There were combinations of compounds which had very interesting electrical and other properties which did not concern the paint industry in particular. He had great faith in the organic inorganic field, and felt sure it would open up undreamed-of possibilities. He mentioned that information on the work he had described was available in complete form from the Australian Scientific Research Liaison Officer at Australia House, London, or from the Division of Industrial Chemistry in Melbourne.

## BUYERS' DELEGATION WELCOMED

### Cementing Trade Relations with British Columbia

THE first buyers' delegation from British Columbia ever to visit the United Kingdom met representatives of British firms engaged in a wide field of export production at a luncheon given in honour of the delegation by the chairman and directors of Benn Brothers, Ltd., proprietors and publishers of *THE CHEMICAL AGE*, at Grosvenor House, Park Lane, London, W.1, on Thursday last week. Mr. Glanvill Benn, chairman of Benn Brothers, Ltd., presided.

The delegation of 25, members of which include principals and executives of the leading importing and distributing houses in British Columbia, is headed by the Hon. L. H. Eyres, Minister of Trade and Industry. Its mission here is to see what British industry can make that is suitable for the British Columbian market in order to redress the balance of trade between the Province and the United Kingdom which at the moment is overwhelmingly in favour of British Columbia.

Sir Ernest Benn proposed the toast of "Our Guests." It was a signal honour, he said, for his firm to be placed so high in priority on the list of the numerous engagements which their distinguished Canadian visitors had to fulfil. There was scarcely a human want in British Columbia with the satisfaction of which members of the delegation were not directly concerned either as manufacturers, importers or distributors and they had come with the freedom and the ability to buy the products of the old country.

#### Glorified Barter

Two-way trade was a very bad second to multilateral trade, which ultimately must be restored, but, declared Sir Ernest, "we are content to-day to carry on a glorified sort of barter business familiar to the patriarchs and we are only too glad to welcome friends from British Columbia for this purpose." Directors of Benn Brothers, Ltd., who had recently been to British Columbia, had returned full of confidence in the future promise of that Province and of Canada. To carry on the good work of extending Anglo-Canadian trade Benn Brothers had taken a stand at the International Fair, which is to open in Toronto at the end of this month.

"We are delighted to know that this is essentially a private buyers' mission," Sir Ernest concluded, "and we want to hear from you what you really think of us. Our ignorance of the rest of the world is posi-

tively abysmal, because of the paper shortage, but you can render us the greatest service by telling us in the bluntest way what people in British Columbia are thinking and saying about us to-day."

The Hon. L. H. Eyres, replying for the delegation, spoke of it as a representative cross-section of the industrial and commercial life of the Province. "We have come to the United Kingdom to look over your goods," he said, "and if possible to find something that is marketable in Western Canada. This is an exploratory as well as a buyers' mission."

Speaking of the vast natural resources of British Columbia, the Minister said that there was enough standing timber in the Province to make a strip a mile wide round the entire circumference of the earth. There were over four million acres of arable land in the Province, of which a little more than a million were under cultivation. Many thousands of acres could be brought into production by irrigation schemes and work on these was now progressing.

#### Restoring Balance

Stressing the desire of the Province to increase trade with the United Kingdom, the Minister pointed out that the trade balance between the two at the moment was not satisfactory. In round figures the Province shipped goods and commodities—timber, fish, fruit—to the value of \$149 million to the United Kingdom but only \$14½ million worth of goods were purchased from the United Kingdom. "We are here to-day because of this," Mr. Eyre asserted. Meanwhile, they had only scratched the surface in developing the full resources of British Columbia, and they sought now "to build British Columbia industry on British products."

Mr. J. C. Pendray (British American Paint Co., Victoria) who supported the Minister's reply to the toast, reaffirmed the great desire of Western Canada to buy more from Britain. It might be thought, that because they were close to the U.S.A. they wanted to buy only from them. "We are very friendly with our southerly neighbours," he added, "but we are most anxious to deal with the Motherland." He hoped that the delegation would achieve a success equal to that of the lumbermen's mission which visited this country in the early '30s. "We shall return," he promised, "determined to do all in our power to increase trade between our Province and Great Britain."

**In London****Camera Tour of the B.I.F.**

**E**XHIBITORS of heavy chemicals, fine chemicals, and insecticides represented at Olympia and their stand numbers are as follows:—

**HEAVY CHEMICALS**

	Stand No.
Albright & Wilson, Ltd., London	B.25
Alchemy, Ltd., London	B.5
Boake, A., Roberts & Co., Ltd., London	B.13
Brotherton & Co., Ltd., Leeds	B.9
Cathode Chemicals, Ltd., London	B.21
Crickshank, R., Ltd., Birmingham	B.42
Dohm, Ltd., London	B.26
Fuellers Earth Union, Ltd., The, Redhill	B.50
Garthwood Co., Ltd., London	B.21
Gas Light & Coke Co., The, London	B.32
General Chemical & Pharmaceutical Co., Ltd., Wembley	B.55
Hemingway & Co., Ltd., London	B.29
Imperial Chemical Industries, Ltd., London	B.41
Industrial Colloids, Ltd. (Associated Bio-Colloids, Ltd.), Altrincham	B.8
Laporte, B., Ltd., Luton	B.61
May & Baker, Ltd., Dagenham	B.62
Mellor, George, & Co., Stoke-on-Trent	B.26
Mond Nickel Co., Ltd., The, London	B.10
Monsanto Chemicals, Ltd., London	B.27
National Colours, Ltd., Stockport	B.26
Northfleet Chemicals, Ltd., London	B.21
Silicon (Organic) Developments, Ltd., London	B.14
South Metropolitan Gas Co., London	B.32
Spence, Peter, & Sons, Ltd., Manchester	B.67
Tyrer, Thomas, & Co., Ltd., London	B.15

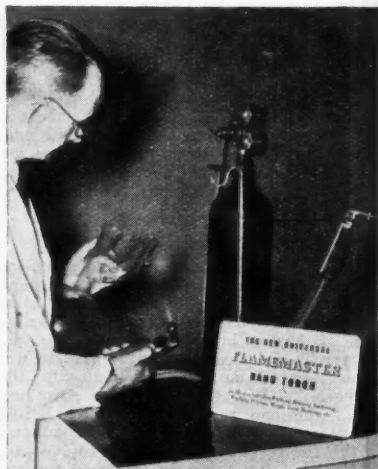
**FINE CHEMICALS**

Abri Corporation (Gt. Britain), Ltd., London	B.30
Boots Pure Drug Co., Ltd., Nottingham	B.68
Bush, W. J., & Co., Ltd., London	B.2
Carnegie Chemicals (Welwyn), Ltd., Welwyn Garden City	B.44
Chemi Synthetics, Ltd., London	B.33
Distillers Co., Ltd., The, London	B.69
Dohm, Ltd., London	B.26
Duncan, Flockhart & Co., London	B.26
Evans Medical Supplies, Ltd., Liverpool	B.3
Genatosan Ltd., Loughborough	B.27
General Chemical & Pharmaceutical Co., Ltd., Wembley	B.55
Grassier Salicylates, Ltd., Sandycroft	B.65
Hexoran Co., Ltd., The, Belper	B.36
Highspeed Steel Alloys, Ltd., Widnes	B.53
Hopkin & Williams, Ltd., London	B.54
Howards & Sons, Ltd., Ilford	B.47
Johnson Matthey, & Co., Ltd., London	J.101 & J.106
Johnson & Sons, Manufacturing Chemists, Ltd., London	B.12
Kaylene, Ltd., London	B.18
Kemball, Bishop & Co., Ltd., London	B.31
Kerfoot, Thomas, & Co., Ltd., Ashton-under-Lyne	B.46
Lankro Chemicals, Ltd., Manchester	B.35
MacFarlan, J. F., & Co., Boreham Wood	B.4
Marchon Products, Ltd., Whitehaven	B.46
Nipa Laboratories, Ltd., Cardiff	B.16
Petrochemicals, Ltd., London	B.43
Pictorial Machinery, Ltd., London	G.2 & G.7
Shell Chemical Manufacturing Co., Ltd., London	B.1
Smith, T. & H., Ltd., Edinburgh	B.63
Sturge, John & E., Ltd., Birmingham	B.7
Thorium, Ltd., London	B.48
Towers, J. W., & Co., Ltd., Widnes	C.37
Tye, John, & Sons, Ltd., London	E.104
Ward, Blenkinsop & Co., Ltd., London	B.66

Watford Chemical Co., Ltd., London	...	B.11
Whiffen & Sons, Ltd., London	...	B.38

**INSECTICIDES**

Acme Chemical Co., Stanwell	...	B.20
Anglo-Dutch Pharmaceutical Co., Ltd., Birmingham	...	E.30
British Solvent Oils, Ltd., Manchester	...	B.22
Bugge's Insecticides, Ltd., Sittingbourne	...	B.37
Burt, Boulton & Haywood, Ltd. (Horticultural Department), London	...	B.3
Coloroll, Ltd., London	...	M.142
Cuttrill, Ltd., London	...	B.22
General Kaputine Syndicate, Ltd., The, Chadderton	...	E.43
Gregory, Walter, & Co., Ltd., Wellington	...	B.17
Low Temperature Carbonisation, Ltd., London	...	B.57
Lucogen (Emulsion) Co., Ltd., Bromley	...	E.100
Lunvale Products, Ltd., Lancaster	...	B.19
Lunt, Peter, & Co., Ltd., Liverpool	...	E.88
Murphy Chemical Co., Ltd., The, St. Albans	...	B.24
Newton, Chambers & Co., Ltd., Sheffield	...	B.28
Portlade By-Product Co., Ltd., Shoreham-by-Sea	...	E.107
Promedico Products, Ltd., London	...	E.7
Walker, W. & F., Ltd., Liverpool	...	E.87



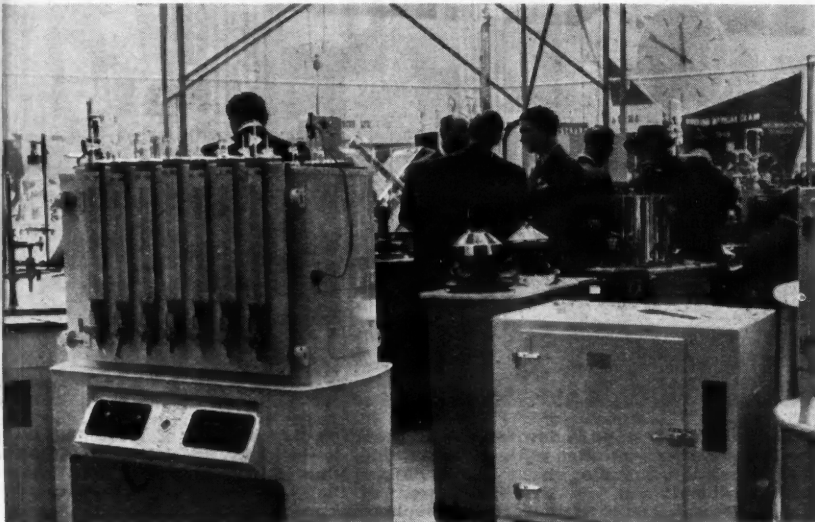
Forming an appropriate adjunct to a fully representative display of chemical glassware on the stand of Chance Bros., Ltd., the new "Flamemaster" torch was shown in use for the first time and commanded much interest among those seeking a very versatile glassworker's tool

In the damp & Co.





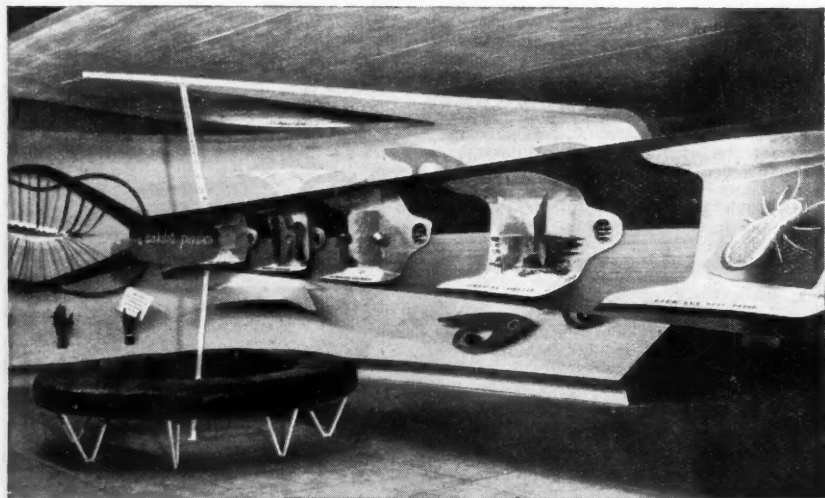
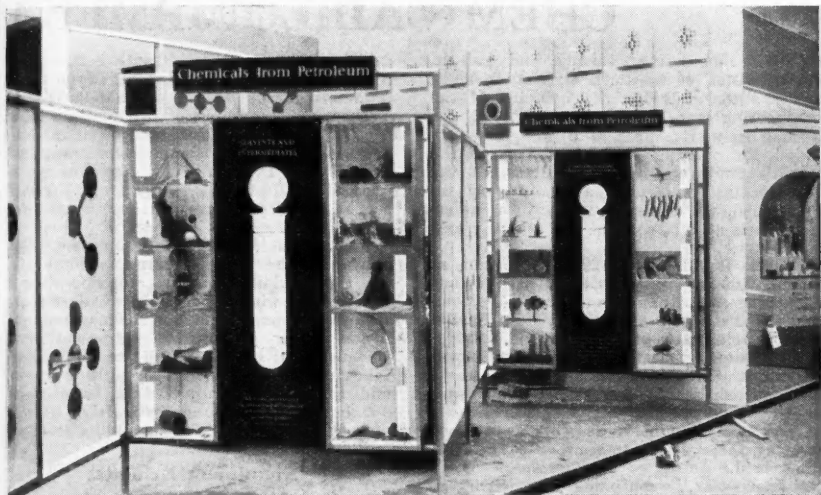
In the Scientific Instruments Section, one of the fullest displays of analytical and air-damped balances and of electrical laboratory equipment was arranged by J. W. Towers & Co. Ltd. (above). The larger electrical appliances and centrifuges (below) were presented by Baird & Tatlock, Ltd.





Most of the I.C.I. stand is devoted to a presentation of "the story of dyestuffs," from the primitive pigmentation of the cave drawings to the highly specialised dyestuffs of the present day, including the newcomer, Alcian Blue. Below: Albright and Wilson's unconventional and effective illustration of the versatility of their numerous industrial phosphorous products





Representing two departments of chemical production in which progress has been particularly rapid since the last B.I.F., the displays of the Shell Manufacturing Co., Ltd. (above) and of Bakelite, Ltd. (below) attracted a considerable following. The Shell exhibits focused attention on the wide field which will be served by the new petroleum-based chemicals, notably the industrial solvents and agriculture chemicals. Something of the same versatility was the keynote of the Bakelite demonstration of the many applications which have been found for new and established plastic materials

# CHEMICAL EQUIPMENT

**T**HE hammering, sawing and painting activities of workmen striving to make ready the stands for the opening of the engineering and hardware section of the British Industries Fair at Birmingham provided for visiting representatives of the world's trade and technical Press, at the preview last week-end, a preliminary indication of the sense of urgency which has characterised all sections of this year's Fair.

This is Birmingham's 22nd exhibition, at which 1100 are participating, with stands occupying more than seven acres. Welcoming the Press on Friday, Mr. G. Neville Sperry, chairman of the Board of Management, claimed that the exhibition will provide concrete evidence, if any is necessary, that British manufacturers are ready and capable of producing goods equal to those of any other country, as well as demonstrating their desire to serve the needs of the world.

"Last year," continued Mr. Sperry, "buyers were disappointed that promises for delivery were long, but on this occasion the position is more favourable and I have no doubt but that supplies can be provided with less delay, although I think it is still correct to say that order books are still fairly well filled."

The chairman also announced the receipt of a telegram from Mr. Harold Wilson, President of the Board of Trade, complimenting the organisers and exhibitors on a "magnificent contribution to the export drive."

Although the majority of exhibits are from the heavy engineering, building and electrical industries, a number of new ideas and inventions are associated with the chemical and metallurgical fields.

## New Electrode Heaters

Among the new developments specially noted in this year's display is a one-piece electrode boiler with which steam can be raised in five to seven minutes by the closing of a switch. A product of G.W.B. Electric Furnaces, Ltd., of Dudley, an associate company of Wild-Barfield Electric Furnaces, Ltd., of Watford, this 70-kW boiler is capable of raising 230 lb. of steam per hour. Visitors to the Fair are now seeing demonstrations of the apparatus, which forms one of the centre-pieces in the display of the group's equipment, covering a range extending from small laboratory muffles to full-scale production furnaces and presented in the shape of large photographs and scale models.

An electrode salt bath by Wild-Barfield,

which is supplied either with a metal pot (Type "M") or a refractory pot (Type "R"). The former is used for cyanide hardening, preheating, hardening carbon and low alloy steels, and quenching and similar heat treatments in the temperature range of 550-950°C. Type "R" finds application in the range 970-1350°C., and covers hardening of high-speed and hot die steels and brazing.

Also attracting attention on the Wild-Barfield stand is a di-electric pellet heater for the moulding industry, incorporating a device by which power applied to the material remains constant throughout the heating cycle in spite of the variation of the electrical properties of the load which takes place. The electrode is 12 by 9 in. and the equipment will heat, subject to certain limitations, approximately 40 oz. of general-purpose phenol moulding material to 100°C. in two minutes.

## Aluminium Exhibits

In the aluminium field, N. C. Joseph, Ltd., Stratford-on-Avon, aroused interest by a display of aluminium beer barrels now being produced at a special plant, believed to be the largest of its kind on this side



One of the most compact of the timing devices on show, the Lendex synchronous timer (Type JPS) which is fitted in a sheet metal case

# AT BIRMINGHAM

of the Atlantic. The firm is showing other types of drums up to 50 gallon capacity, all solid drawn. British Aluminium Co., Ltd., London, is represented by exhibits of aluminium plate, extrusions, and rivets with particular application to marine and bridge-building projects.

Probably the most striking stand among the aluminium industry exhibitors is the outdoor "Alframe" building of Birmid Industries, Ltd., housing latest developments in sand and gravity die castings, large bases for machine tools in sand cast aluminium, and a new plastic coated aluminium sheet and strip—"Birlon"—which enables polished material to be operated under the press and without damage to the surface. The plastic material is stripped afterwards and leaves a more highly polished finish produced at considerably smaller cost than by the old hand method.

Closely linked with the finish of aluminium products is a new keying solution which, in one operation, is claimed to remove oxidation, prevent its recurrence and act as a binding agent between aluminium and paint. This latest process, "Jenolising," has been developed by Jenolite, Ltd., London, and the firm states that, utilising in most cases a single dipping tank instead of the normal four or five de-rusting, neutralising, swilling and rust-proofing tanks, the pre-treatment of metals becomes a much more economic proposition. The tank can be lead or rubber lined, or made of earthenware, glass or

special cement. Once the article has been dried after pre-treatment the chemical action is claimed to cease completely.

Projectile & Engineering Co., Ltd., London, bring a new development to injection moulding by a machine built on a three-unit principle—main plate and operating assembly, hydraulic control base and electric and heat control ensuring easy maintenance.

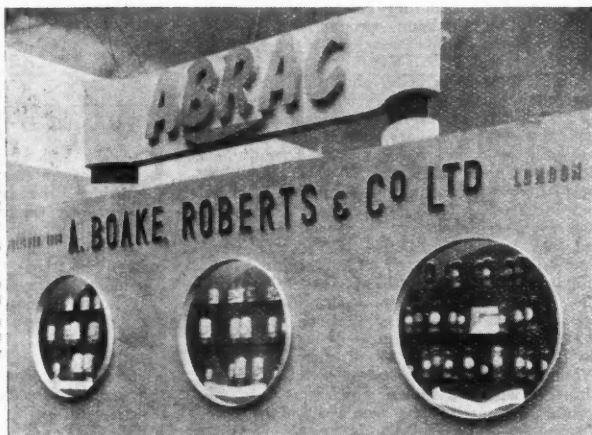
## New Metal Coatings

Another firm specialising in the production of protective coatings for metals is Cellon, Ltd., Kingston-upon-Thames, displaying a specially prepared plastic applied by spray or roller under controlled conditions of heat and humidity. After the application of a film of .001 to .002 in., according to the purpose in view, the material air dries in 20 to 30 minutes and adheres closely to the surface of the metal. It can, however, be removed by lifting a corner and peeling like a skin. Metal treated by this plastic film is protected from tarnish and scratching and is sufficiently tensile to allow a polished sheet to be pressed before the coating is removed.

Further development work on low-temperature groundcoats for steel is revealed in the new groundcoat and white enamel frits produced by Ferro Enamels, Ltd., Wolverhampton. These can both be fired together, thus obviating changes in furnace temperature.

A fine grinder, the result of intensive research by technicians of British Jeffrey-Diamond, Ltd., Wakefield, is on view. The

The wide-ranging interests of A. Boake Roberts & Co., Ltd., are well represented on this stand where, among the principal products of general interest, were metallic soaps, solvents, plasticisers, intermediates, sulphites and phosphates, liquid SO<sub>2</sub>, saponines, synthetics and isolates, resins, essential oils, perfume essences and perfumery chemicals (*Olympia*.)



mill produces between 50- and 300-mesh screen in one operation and in one hour 3000 lb. of gypsum can be processed, 90 per cent of which will pass 100 mesh.

Other new inventions include a patented cork cement flooring in which liquid colours have been incorporated and which can be used on any type of prepared base. This is manufactured by Scalocrete Products, Ltd., London. The moisture tester, which Radio Heaters, Ltd., Wokingham, has developed, enables moisture tests on many materials to be performed in minutes instead of hours; wood flour, for example, can be moisture-tested in three minutes instead of 16 hours.

Examples of foundry sand mixes and a set of production castings incorporating the use of a new bonding material, "Fulbond," form part of the display by The Fullers' Earth Union, Ltd., Redhill. Another material—"Fulbent"—possessing high swelling and gel-forming properties, is also exhibited. This is used extensively for oil well drilling mud and in muds for all types of exploratory drillings.

### Metal Powders

George Cohen, Sons & Co., Ltd., London, show two types of iron powder. One of them, "Sintrex" electrolytic iron powder, finds a wide application in the metallurgical industry for small unstressed components, oilless bearings and sintered permanent magnets. The other, a grey cast powder, is extensively used in the chemical industry as a reducing agent in the production of organic chemicals. It can also be utilised in concrete floor-hardening.

Dispersions, compounded latex, and solutions with manifold uses in a wide range of industries, including carpet, upholstery, leather and linoleum production, are a feature of the stands occupied by the Dunlop organisation.

Much interest is being shown in an alloy, perfected by Imperial Chemical Industries, Ltd., which contains copper, nickel and iron and is resistant to corrosion and erosion by hot and cold sea-water to an exceptional degree. Tubes fabricated of this alloy can be bent or flanged by any coppersmith, sizes ranging from  $\frac{1}{2}$  to 12 in. diameter. Experimentation with a wide range of alloys at extreme temperatures has led to the production by the company of aluminium-brass tubes, retaining strength at temperatures in the region of 400° C. and suitable for oil apparatus and similar installations.

Demonstrations of tungsten carbide tooling form the basis of the display by A. C. Wickman, Ltd., Coventry. A vitrified abrasive wheel is shown which was cut and formed by one of the firm's standard cutting tools. The tool itself can also be in-

spected, and compared with two other high-speed steel tools used in the same test and which were extensively damaged during the operation.

F. Blaby & Co., Ltd., London, displays a wide range of metal plate and sheet metal manufactured for use in the chemical, oil and food industries, including steel drums, tanks and bins, and aluminium accessories, including tiles.

Three high-frequency generators utilised in tempering, hardening, annealing, soldering and melting processes are exhibited on the stand of the Philips Electrical Group.

One of these generators—a 500 kc. type with an output of 2.5 kW—is an entirely new production. The apparatus measures 5 ft. by 3 ft. by 3 ft. (152 by 91.4 by 91.4 cm.). The other two with which demonstrations are being given throughout the period of the exhibition, have work outputs of 20 and 50 kW respectively, and feature compactness of design, ease of operation and maintenance and new safety devices.

An electric stove showing the vitreous enamelling process, a complete set of ceramics and carbon monoxide indicators, the latter perfected during the war, are displayed by the Royal Ordnance Factories.

Another interesting feature, among many, at the exhibition was the use of granulated peat instead of cork as an insulating medium in the thermal storage heaters produced by Hotric, Ltd., West Lothian. Under a series of tests, peat has retained heat 25 per cent longer than cork, affording a considerable saving of electric current in thermostatically controlled heaters. The package density of peat is 6.75 lb. per cu. ft. and, unlike cork, there is no necessity to take precautions after packing against subsequent expansion.

### CIBA AND AERO RESEARCH

CIBA, Ltd. has acquired a controlling interest in Aero Research, Ltd., Duxford, Cambridge, the specialists in research work on synthetic resins and in the manufacture of industrial adhesives. The continuation of technological connections, which have existed between the two companies for a considerable time, is thus assured.

It is stated by the companies that plans for the large-scale expansion of Aero Research, Ltd., have been approved, and that both research facilities and production resources will continue to be developed under the managerial control of the Aero Research directors, Dr. N. A. de Bruyne and Mr. R. F. G. Lea.



## American Chemical Notebook

From Our New York Correspondent

THE election of Dr. George O. Curme, Jr., as vice-president for chemical research of the Union Carbide and Carbon Corporation, was announced last week. Dr. Curme, who for many years has been a vice-president and director of both the Bakelite Corporation and Carbide and Carbon Chemicals Corporation, units of Union Carbide, is a pioneer in the American organic chemical industry. He was the first to develop the chemistry of aliphatic compounds in the United States and his research on acetylene at the Mellon Institute of Industrial Research, from 1914 to 1919, resulted in the formation in 1920 of Carbide and Carbon Chemicals Corporation. Since then Dr. Curme has seen the commercial output of his research findings expand to vast proportions. These products include synthetic ethyl alcohol, ethylene glycol, acetic anhydride, vinyl plastics, and some 200 other aliphatic chemicals. The recipient of many medals and awards in recognition of his achievements in chemistry, Dr. Curme is an active member of the American Chemical Society, the American Institute of Chemical Engineers, the American Association for the Advancement of Science, the Society of Chemical Industry, the Société de Chimie Industrielle, and the Chemists' Club, New York. (Picture, page 662)

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Mr. L. E. Ulrope, manager of direct marketing for Esso Standard Oil Company, addressing the annual meeting of the Empire State Petroleum Association last week at the Hotel Roosevelt, New York, urged petroleum jobbers and distributors to join a drive by the entire industry to combat nationalisation trends. Citing a recent survey made by his company on the Eastern Seaboard, Mr. Ulrope said that toleration for government control has risen alarmingly and that thirty-two per cent of the replies to the widely distributed questionnaire expressed the opinion that oil companies in one way or another were to blame for shortages. Thirty-eight per cent of those polled believed that some form of government control or supervision would serve to improve control or supervision would serve to improve conditions. To deal with adverse public opinion and to avert the risk of government intervention in the industry's activities, Mr. Ulrope called upon industrial leaders to establish better public relations.

Addressing the same meeting, Dr. Richard S. Meriam, economist of the Harvard School of Business Administration, traced the growth in political, governmental

bureaus, and in other groups of the economy, for nationalisation of various business activities, including oil.

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To increase stock-piling in the United States and encourage production of tin, Mr. Ricardo Martinez Vargas, Bolivian Ambassador, proposed last week that either the price of the metal should be raised or it should be returned to the free market. He said that he will ask the International Tin Study Group to recommend a price of not lower than \$1.07 per lb. for fine tin as against the current price of 90 cents, with the understanding that the price could be reconsidered every six months to meet changes in the prices of machinery and materials that influence production costs.

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The U.S. Department of Commerce announced last week that the Government will direct American tinplate producers to furnish 108,000 tons of tinplate for export during the third quarter of this year. The whole production, which is 4000 tons below the quota for the second quarter, must be used for food preservation. Approved foreign orders for the tinplate will be supported by priority ratings and must be accepted by American producers the Department announced. In addition to the 108,000 tons, another 12,000 tons of tinplate can be licensed for export, although not on a priority rating. Of the latter amount, 5000 tons would be for the packing of food abroad to be shipped to the U.S.A., and the remaining 7000 tons for use abroad by American oil companies.

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News of a copper-detection method which is "so sensitive that copper can be detected on the fingers of a person who has merely picked up a copper coin" was given at an ACS meeting, Centenary College, Shreveport, La., last week by Prof. P. W. West, of Louisiana State University. He explained that a drop of solution to be analysed for copper is treated with a special chemical. If there is any copper in the drop a distinctive colour forms almost immediately, and by its intensity a trained chemist can estimate the copper content accurately. Prof. West added that the test requires a chemical that reacts only with copper, and while few chemicals with such specific action are available, there are techniques which enable the chemist to "condition" the drop before testing for a particular ingredient.

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## Technical Publications

**M**AKING its first appearance is the *Quarterly Gazette* of the British Coal Utilisation Research Association. It plans to present personalities and events in the fuel and power industries, and to give factual accounts of research and development projects of the association. No. 1 includes a review of the organisation's activities in 1947, and an illustrated description of the principles and applications of the down-jet furnace. There is an interesting pictorial feature devoted to Lord Hyndley's visit to the Leatherhead Experimental Station.

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The main features of *The Journal* of the Franklin Institute, March 1948 (Vol. 245, No. 3) are "A Study of Patent Policies in Educational Institutions," by V. L. McKusick, and "Construction of Alignment Nomogram from Empirical Data," by Lo-Ho (Tangshan Engineering College, North China). Supporting notes from the National Bureau of Standards and the Biochemical Research Foundation, and book reviews, etc., complete this very informative issue.

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A comparatively recent periodical of more than ordinary interest is *Quarterly Reviews* published by the Chemical Society. Since its first appearance last year, it has received an additional paper allocation, permitting a limited increase in the number of new subscriptions. Vol. 2, No. 1, deals with the following subjects: "Disproportionation in Organic Compounds"; "The Chemistry of Silicon Polymers"; "Physiologically Active Unsaturated Lactones"; and "Far Ultra-violet Spectra, Ionisation Potentials, and their Significance in Chemistry."

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Advance information on the contents of a brochure shortly to be published by Wild-Barfield Electric Furnaces, Ltd., promises a new technique for the carburisation of steel by a prepared town's gas process, which is claimed to have distinct advantages over methods employing solid or liquid media. The equipment is described as using town's gas direct from the mains, and preparing it for carburising without the addition of such gases as butane or propane. Other merits listed are: Precise control, shorter time of treatment, low cost, and compactness.

Chemists concerned with electro-chemical processes may find much to interest them in *Philips Technical Review*, Vol. 9, No. 8. Its contents include: "Fifty Years of Electrons," "The Drying Lamp and its most Important Applications," with supporting articles on emergency electricity supply systems, and semi-conductors. Copies are obtainable from Philips Electrical, Ltd., Century House, London, W.C.2.

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Following the wide interest shown in the first postwar edition of "British Exports and Exchange Restrictions Abroad," published by the Swiss Bank Corporation in January last, many exporters will be glad to hear that a second edition, containing the official returns for 1947, and various corrections, is now available. Setting out the regulations affecting trade between all countries and the U.K., and doing so in a concise manner to facilitate easy reference and assimilation, the book serves a real need.

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"ZDA Abstracts" March (Vol. 6, No. 3) contains much of interest to the metallurgist and others associated with non-ferrous metals industry. Contents include abstracts on die casting, hot-dip galvanising, finishing, metal spraying, soldering and welding, zinc oxide, corrosion, and toxicity. Copies are obtainable from the Zinc Development Association, Lincoln House, Turl Street, Oxford.

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Of importance to metallurgists and others is a method for the determination of copper in permanent magnet alloys (which may also contain small percentages of aluminium, nickel, cobalt, copper, and titanium) just published as British Standard 1121: Part 5, 1948, "Copper in Permanent Magnet Alloys." It provides useful guidance on procedure and calculation, and is obtainable from the Sales Department of the British Standards Institution, 24/28 Victoria Street, S.W.1, price 6d.

**BIF Air Taxi Service.**—An air taxi service between London and Birmingham will operate during the BIF. The service will operate between Hendon to Castle Bromwich and planes will cover the journey in either direction in about 45 minutes. The fare will be £4 18s. return and £2 15s. single.

## Parliamentary Topics

**London Metal Market.**—No decision has yet been taken with regard to the re-opening of the London Metal Market. The delay is due to the acute shortage of the metals dealt with.—Mr. G. R. Strauss.

**Electrode Shortage.**—There is a general shortage of welding electrodes, particularly in the heavier gauges. Measures are being taken to expand the output of the high grade steels needed for the production of electrode wire and to supplement this temporarily by special electric furnace production.—Mr. G. R. Strauss.

**Mild Steel Plate Production.**—There is a general shortage of mild steel plate, but all available capacity for the production of plate is at present being fully used. Capacity is being expanded, but additional supplies will not be available for some time.—Mr. G. R. Strauss.

**Scientific and Technical Books.**—Learned, scientific and technical publications may now be imported at twice the rate hitherto permissible, thus raising the annual import quota to 200 per cent by value of the pre-war level.—Mr. H. Wilson.

**Chemicals (Export Target).**—Now that more chemicals than previously are needed to produce other goods for export, the export target has been slightly reduced in order that chemicals may be exported in the most profitable form, which is often as components of other manufactured goods. Subject to the availability of raw materials and labour, productive capacity is, so far as I am aware, being used to the best advantage.—Mr. A. G. Bottomley.

**Ground Sulphur Prices.**—In reply to a question by Mr. Erroll who wanted to know why it had been found necessary to increase the maximum prices of ground sulphur, Mr. A. G. Bottomley said this had been due to advances in both the producers' selling price of crude sulphur and in freight rates made on January 1 last.

**Petrol Dye.**—In moving the second reading of the Motor Spirit (Regulation) Bill in the Commons on Monday, Mr. H. T. Gaitskell, Minister of Fuel and Power said that the Russell Vick Report proposed adding to the commercial petrol first a dye, and secondly a chemical which could be readily identified. He thought there may have been some misunderstanding about it, adding:

"It may be possible to remove the dye, but it would not help any offender if he were to succeed in doing it, because he would find

it very much more difficult, I think, to remove the chemical, and the chemical is fortunately easily detected by a simple process with which the police will be familiar. It will be detectable in what I think the Russell Vick Committee called a weak solution. I do not think we need worry very much about that.

**British Inventions.**—Another Bill to receive a second reading in the House of Lords last week was the Development of Inventions Bill. Moving the second reading, Lord Hall said although we had been second to none in producing ideas, we had some times been slow to use them, or had neglected them. An example of this had been Sir William Perkin's research which had founded the aniline dye industry. His successors failed to carry on his research and in consequence initiative had passed to the German dye industry.

**Radioactive Substances.**—In moving the second reading of the Radioactive Substances Bill in the House of Lords last week, Lord Henderson said its primary purpose was to protect the health of workpeople and the public generally against the harmful effects of undue exposure to dangerous radiation from naturally radioactive and artificially-produced substances, and certain types of apparatus. The Bill was largely an enabling measure, and the measures of control would be laid down by regulation. An advisory committee would be set up, and it would work in co-operation with learned bodies.

**Dr. Van der Bijl's Steel Report.**—A question by Viscount Elibank tabled in the House of Lords on May 4, asked whether the Government would publish the report made to H.M. Government by Dr. J. Van der Bijl, head of the South African iron and steel industry, who visited Britain two years ago at the request of H.M. Government to investigate the iron and steel industry here. Replying, Lord Henderson said that Dr. Van der Bijl's report was not made with a view to publication, and the Government did not see its way to comply with the request for publication.

**New Chemical Notation.**—The International Union of Chemistry and the Fédération Internationale de Documentation has under consideration the new system of chemical notation which has been developed by Messrs. M. Gordon, C. E. Kendall and W. H. T. Davison of the Fort Dunlop laboratories (The Chemical Age, October 25, 1947).



## Home News Items

**Model Cyclotron.**—Among the 400 exhibits at a recent Hobbies Exhibition—open to GPO staff between the ages of 14 and 21 years employed in the London Telecommunications Region—was a scale model of a cyclotron.

**Geological Exhibition.**—Arranged by the Department of Geology at Manchester Museum, a special exhibition dealing with radioactivity and radioactive minerals has been opened at the Tolson Memorial Museum, Huddersfield. One of the exhibits is a gold leaf electroscope used by the late Lord Rutherford.

**ROF Explosion.**—An explosion followed by fire in a sulphuric acid tank last week, seriously injured two labourers at Drigg, Cumberland, Royal Ordnance Factory. A gang of men were employed in cleaning out the tank, but most of them had not resumed after the mid-day break when the accident happened. The two men, caught in the blast, received extensive shock and burns.

**Johnson Matthey Play.**—The Johnson Matthey Players gave a commendable performance of "See How They Run," a farce, at King George's Hall, Adelphi Place, W.1, on Saturday, May 1. Leading rôles were played by Mr. John Hopkinson and Miss Molly Roden, and their accomplished acting delighted the 750 members of the audience. Top marks are awarded to the producer, Mr. Frank Braby.

**I.C.I. Celebration.**—The seventy-fifth anniversary of the founding of the explosives factory at Ardeer, Ayrshire, now controlled by the I.C.I., is to be celebrated this month by a boat trip down the Clyde for the 11,000 employees. They are to be taken to Dunoon in two parties, and work at the factory will go on uninterruptedly.

**Scottish Steel Agreement.**—It is understood that a temporary agreement has been reached between Stewarts & Lloyds, Ltd., Clydesdale Steel Works, Mossend, Lanarkshire, and Colvilles, Ltd., Motherwell, for the supply of steel ingots. At present the Clydesdale works is producing more steel than is required to fulfil current orders. A sample test of 60 tons of ingots has been made and found to be satisfactory. These will be transferred to Motherwell, where they will be made into steel plates, etc. When the new tube mill at the Clydesdale works has been completed, the entire output can be absorbed.

**Engineers Reduce Prices.**—E. Boydell & Co., Ltd., announces that prices of the Muir-Hill "Hiway" 3 yd. dumper (Models 10S and 10B) will be reduced by £15, and of the shunting tractor (Model 100) by £10. These reductions are made in accordance with the Government's policy expressed in the recent FBI report.

**Scottish Oil Equipment.**—Scottish engineering interests are being encouraged to participate more fully in the supply of oilfield equipment to the British and world oil industry. At a conference held in Glasgow last week the report of Middle East oil developments was discussed by Council of British Manufacturers of Petroleum Equipment with Scottish engineering concerns capable of assisting in this development.

### OFFICIAL NOTICES

**Token Import Scheme.**—The Board of Trade announces that Luxembourg has now been included in the countries participating in the Token Import Scheme in 1948. Luxembourg is the 14th added to the list.

**Key Industry Duty Exemptions.**—The Treasury has made an Order under Section 10 (5) of the Finance Act, 1926, exempting oxalic acid, dicyclohexyl phthalate, dicapryl phthalate and tricresyl phosphate from Key Industry Duty for the period May 3 to August 19. The Order is entitled *The Safeguarding of Industries (Exemption) (No. 4) Order, 1948* and is published as Statutory Instrument 1948 No. 852. Copies may be obtained from H.M.S.O., price 1d.

**Home Grown Linseed Control.**—To ensure that home grown linseed is directed to Ministry of Food crushing mills for the production of linseed oil, which is urgently needed, the Minister of Food has made the Home Grown Linseed (Control) Order, 1948, which comes into force on May 18. It provides that home grown linseed for industrial uses may be sold by growers only to persons or firms licensed by the Minister as approved buyers; approved buyers, in turn, may re-sell only to the Minister. No licences are required by growers.

**Liquid Rosin Price Reduced.**—The Board of Trade announces that as from May 1, the selling price of liquid rosin, distributed through the agency of the Liquid Rosin Importers' Association, 84 Leadenhall Street, London, E.C.3, has been reduced from £44 to £38 per ton net, ex-warehouse.

## PERSONAL

MR. H. W. CLARKE has been appointed an additional director of Pinchin Johnson and Associates.

SIR ALEXANDER FLEMING, who will visit Seville next June, has been elected honorary member of the Seville Royal Academy of Medicine, and will receive a gold medal.

SIR ALEXANDER CAMPBELL MACLEAN, of Bournemouth, manufacturer of toothpaste and other preparations, and who gave away well over £250,000 for the advancement of medical science, left £286,921.

DON SIMON ITURI PATINO, of Oruro, Bolivia, the "tin king," owner of a smelting plant at Bootle, near Liverpool, who died intestate (his fortune has been estimated at £75 million), left estate in England valued at £2718.

MR. J. E. POWERS, office comptroller, Liverpool Gas Company, has been elected president of the Liverpool Branch of the Incorporated Cost and Works Accountants. MR. J. BAKER (Lever Bros.) has been elected chairman.

The Minister of Fuel has appointed SIR ROBERT BURROWS to be a member of the National Coal Board. He will serve in a part-time capacity and, at his own request, will receive no remuneration. He was formerly chairman of Lancashire Associated Collieries, Ltd., Manchester Collieries, Ltd., and of the LMS Railway Company from 1946-48.

DR. LESLIE F. WIGGINS, Director of the Chemistry Department, Birmingham University, has received the £1250 sugar research prize for chemical discoveries changing sugar into substances which are components for making nylon and sulfa drugs. The award is sponsored by the United States Sugar Research Foundation and presented by the National Science Fund. In September, Dr. Wiggins will take up an appointment as Director of Research for the British West Indies Sugar Research Association.

PROF. W. T. ASTBURY, of Leeds University, is to receive a grant of £21,000 from the Rockefeller Foundation for research purposes. He is already receiving £2000 a year from the Foundation for his research into molecular structure. The money will be spread over 10 years. Textile industry leaders are keenly interested in Prof. Astbury's inquiries, which they hope will lead to the production of a substitute for wool. He has already produced fibres from seaweed, eggs, milk, blood and soya beans. He said: "My hope is that my researches will develop on the lines of a possible cure for cancer."

MR. K. N. MODI, general manager of Modi Industries, Modinagar, N. India, has left India for a business tour of the U.K.,



Dr. George R. Curme, Jr., newly-elected vice-president in charge of chemical research, Union Carbide & Carbon Corp. He was the first to develop the chemistry of aliphatic compounds in the U.S.A.

the Continent and the U.S.A. One of his objectives is to study industrial developments in their relation to the food, chemical and textile enterprises he controls, to which are now being added glass and heavy chemicals.

MR. E. M. MYERS, Divisional Coal Preparation Engineer for the Northern Divisional, Coal Board, has been elected chairman of the Newcastle-on-Tyne Section of the Society of Chemical Industry. He succeeds DR. A. E. J. VICKERS, of Imperial Chemical Industries, Ltd., Billingham-on-Tees.

## Obituary

MR. CHARLES ENNION, assistant works manager, Clayton Aniline Co., Ltd., since May, 1946, who was to succeed MR. E. N. MARCHANT (retiring) as works manager last week, died suddenly on April 28. Mr. Ennion had been with the company since 1922.

MR. TOM WOODHEAD, of Newlands Farm, Holmfirth, a partner in the firm of Abel Woodhead (Chemicals), Ltd., Holmfirth, Huddersfield, died in Huddersfield Royal Infirmary last week aged 59.

## Overseas News Items

**U.S. Tetraethyl Lead Price Up.**—The first increase since 1942 in the price of U.S. tetraethyl lead from 49.48 cents to 54.98 cents a lb. has recently been announced by the U.S. Ethyl Corporation.

**French Chemical Imports From U.K.**—In the first quarter of this year, France imported from the United Kingdom the following important chemical products (in metric tons): ammonium chloride 50.8, various nitrogenous fertilisers 28,350, copper sulphate 4132.6, nickel sulphate 174.9, acetone 3.3, pitch 2.4, and quebracho extract 22.

**French Oil Company's Results.**—The Société Anonyme des Exploitations Minières de Pechelbronn, which exploits the old oil fields in Pechelbronn, Alsace, states that a net profit of 29 million francs was made last year, an increase of 4.9 million francs over 1946. The dividend remains unchanged at 8 per cent.

**More Bauxite Sought.**—Italian technicians are studying the possibility of exploiting bauxite deposits near Lecce and Otranto. No detailed report is yet available but it appears that these are not inferior in size and quality of ore to those which Italy lost in Istria under the peace-treaty. The creation of aluminium industry in this part of Italy is being hampered by the absence of sufficiently large electric generating stations.

**Radar for Sterilising Food.**—The use of radar to sterilise canned and package food promises better tasting and more nutritious products, according to Mr. Frank J. Yourga, chief food technologist of the Hartford-Empire Company, Hartford, Connecticut, in a report to the American Chemical Society. He added that bacteria in food could be destroyed in a few seconds by high frequency radar or radio waves which generate heat within the food.

**Taiwan Industries Report.**—According to the annual report of the Chinese Government's National Resources Commission, among industries on the island of Taiwan (Formosa) in which progress was made last year, were caustic soda with an output of 370 tons monthly, and aluminium which averaged only 600 tons a year during the island's 50 years of Japanese rule, and is now increased to 4000 tons per annum through the provision of new equipment. The Taiwan oil refineries are producing 500,000 gallons of motor fuel, 300,000 gallons of kerosene, 30,000 gallons of diesel oil and 1.5 million gallons of fuel oil each month. Output of cement is to be brought up to 360,000 tons per year from the present level of 200,000 tons.

**Ownership of I.G. Farben Assets.**—The U.S. Supreme Court has refused to hear an appeal by the Standard Oil Co. (N.J.) in its suit to recover shares of stock and patents in the U.S.A., which were taken over by the U.S. Government during the war as property of the I.G. Farbenindustrie.

**Germany's Sulphur Production.**—It is expected that the Anglo-American zone of Germany will produce this year some 20,000 tons of sulphur, an increase of 8000 tons over the 1947 figure. Requirements are estimated at about 32,000 tons. All sulphur is derived as a by-product of the gas industry.

**Polish Trade with Sweden.**—An important one-year trade agreement has recently been signed between Poland and Sweden. It envisages the export of Polish coal and coke (four million metric tons), iron, zinc and common salt. Cellulose, iron-ore and ball bearings are the main items to be supplied by the Swedes.

**Italian Bergamot Essence.**—About 165,000 kg. of bergamot essence will be produced this year in Italy, as against 138,000 kg. last year and 159,000 kg. the year before. Since the war, bergamot essence has found markets very easily and has led to the revival of the cultivation of bergamot plants. At present, the market is depressed, however, and a considerable amount of bergamot essence is still on producers' hands.

**Guatemalan Mineral Exploitation.**—A 40-year concession has been granted to the Cia. Minera de Guatemala, S.A., for the exploitation of minerals in the district of San Juan Chamelco, Department of Alta Verapaz, where important lead deposits are believed to exist. The company also has the right to exploit radio-active substances. Important U.S. interests are believed to be involved and a large capital outlay contemplated.

**China's Tung Oil Exports.**—Tung oil appears to be the only commodity in which China could re-establish her pre-war international trade connection. Shipments last year totalled about 74,000 tons, worth approximately £7.5 million. This figure is stated to be equal to the average for the period 1935-39. About two-thirds of the shipments were absorbed by the U.S.A., and Britain took just over 10 per cent and the U.S.S.R. some 4 per cent. It is hoped to harvest some 80,000 tons this year and maintain the 1947 level of exports. Afforestation schemes and improvements to the various production phases are being undertaken by the Government to increase output.

# DUST EXPLOSIONS IN FACTORIES

## How They Can be Prevented or Minimised

A SUCCESSFUL session of meetings of the North-Western Branch of the Institution of Chemical Engineers ended at The College of Technology, Manchester, on April 24, when a paper, "Dust Explosions in Factories," was presented by Mr. S. H. Wilkes, HM Senior Chemical Inspector of Factories.

Inflammable dusts (said Mr. Wilkes) may be explosive if they are mixed with air between upper and lower limits of concentration and if they are heated above a certain temperature. Explosions are prevented when these conditions are avoided but all possible means should be taken to minimise the effect of an explosion if it should occur. Dust occurs most frequently in milling operations where materials are ground to powders, flour or meal, in industries which use the ground products, and in industries which polish articles, thereby producing dust as a by-product. It is likely that the dust concentration in the grinding mill is above the explosive limit but ignited dust from the mill may ignite a cloud which is within the limits of a concentration for an explosion. The cloud in a rotary mill may be explosive under special conditions at the beginning or the end of operations. Explosions occur in ducting, in cyclones and in bag filters. Explosions on bucket elevators are particularly dangerous as flaming dust is at once ejected on several floors of a building. Screens contain sufficient material to form a cloud if they receive a mechanical shock. The most disastrous explosions are caused by dusts which have

escaped from the equipment, have settled in the work-rooms and have accumulated.

The risk of explosions is lessened by grinding in inert atmospheres and by collecting the dust in wet scrubbers. The temperatures of heaps of inflammable dusts should be taken regularly and mills should be adjusted to prevent the generation of intense heat locally and hard materials prevented from entering the mill. Charges of static electricity may be avoided by earthing the plant and the material and the non-conducting parts may be treated with a conductive material. The inflammable material may be mixed with inert materials before grinding.

### Explosion Reliefs

A dust system cannot be rendered non-explosive once the explosion has begun, but separation of units of plant limits the effect of an explosion. Explosion reliefs are the light, fragile panel and the hinged door; they must act almost instantly and release enormous volumes of gas. An explosion relief should be in the open air and be fitted on all relatively weak parts of the plant. The burst panel allows blazing dust to be ejected whereas the hinged door closes again after the explosion has passed. The equipment should be made to withstand explosion pressures and the reliefs added as safety valves. The blast-proof enclosure which has three or four strong walls should contain no operatives when the plant is working. A weak, fragile material is used to protect the equipment from the weather.

## LETTER TO THE EDITOR

### Lost Drugs

SIR,—Almost every week it appears necessary for the BBC to warn listeners that some dangerous drug, often phenobarbitone, has been lost or stolen.

Pharmacists in their businesses are subject to very strict regulations regarding the storage and supply of drugs of this character, and by what is general carelessness on the part of the public, many of these precautions (irksome in many cases to the pharmacist) are being nullified, and I have heard it suggested that the loss of dangerous drugs should become a punishable offence.

In order to alleviate the danger occa-

sioned by the loss of these drugs, might I suggest to my professional colleagues that they might usefully fix a label to such packages stating "this is a medicine to be taken only by the person for whom it has been prescribed." Again might I suggest to the medical profession that barbiturates and similar preparations should not be prescribed in quantities greater than the immediate need of the patient warrants, and lastly, might I urge upon the public at large to take much greater care of the very potent substances which are entrusted to their charge.—Yours, etc.,

F. C. WILSON

(Member of the Pharmaceutical Society).  
87 Aylward Road,  
Merton Park, S.W.20

## Next Week's Events

### MONDAY, MAY 10

**Royal Institute of Chemistry.** (Hull and District Section). Royal Station Hotel, Hull, 7.0 p.m. Annual general meeting. Dr. H. J. T. Ellingham: Lecture.

### TUESDAY, MAY 11

**Society of Public Analysts.** (Biological Methods Group). Rooms of the Chemical Society, Burlington House, Piccadilly, W.1; 6.30 p.m. A. A. Miles: "Biological Standards."

**Royal Institute of Chemistry.** (London and S.E. Counties Section). Visits to Shell Refinery & Marketing Co., Ltd., Shell Haven, 9.4 a.m. Fenchurch Street Station; 10.23 a.m. Stanford-le-Hope Station.

**Society of Instrument Technology.** College of Technology, Manchester, 7.15 p.m. Annual general meeting. C. F. Budenberg: "Pressure Gauges with Special Reference to their Selection, Installation and Maintenance."

### THURSDAY, MAY 13

**Chemical Society.** (Manchester Section). Chemistry Department, University, Manchester, 6.30 p.m. Prof. L. R. Pauling: "The Chemical Bond."

### FRIDAY, MAY 14

**British Association of Chemists.** (Birmingham Section). University, Edmund Street, Birmingham, 6.30 p.m. Dr. J. F. J. Dippey: "Observations on the Strength of Organic Acids."

**Royal Institution.** 21 Albemarle Street, London, W.1, 9.0 p.m. Sir Ian Heilbron: "The Role of Chemistry in Combating Tropical Diseases."

## Physics of Solids

**A** SUMMER School in the Physics of Solids, with particular reference to the properties of ionic solids, will be held in the H. H. Wills Physical Laboratory, University of Bristol, from September 8-15 inclusive. Lectures will be given by Prof. N. F. Mott, Dr. J. W. Mitchell, other members of the staff of the laboratory, and research workers. The school is sponsored by the laboratory, the Department of Adult Education and the Institute of Physics.

### Experimentation and Theory

The course is intended for Government and industrial laboratory staffs who wish to familiarise themselves with both experimental and theoretical work on the properties of ionic solids, particularly in fields beyond those with which they are directly concerned. Lectures will review previous work, discuss the planning of experimental work in these fields, and present the experimental background of the models on which the theoretical work is based. The theoretical lectures will be devoted to the fundamental ideas and to recent results of theoretical investigations.

Applications and inquiries should be addressed to Mr. W. E. Salt, The University, Bristol 8.

The fee will be 8 guineas and those wishing to attend the school are asked to state their age, university and degree, and research experience.

## SCI'S EDINBURGH PROGRAMME

**A** FULL programme of social activities has been arranged for the annual general meeting of the Edinburgh Section of the Society of Chemical Industry, which is to be held at Edinburgh from July 12-17. It will be initiated by a reception on the evening of July 12 by the chairman of the Edinburgh and East of Scotland Section (Dr. W. M. Ames) and Mrs. Ames. On July 13 there will be an exhibition of Highland dancing, a ladies' coffee party and a mannequin parade. Later there will be a garden party and a dance.

The programme for July 14 will include a motor-coach outing and tour of Old Edinburgh. The 67th annual dinner will be held in the evening and followed by dancing.

Similar outings have been arranged for July 15, when there will also be a civic reception. Edinburgh University is giving a reception on July 16 followed later by a farewell party and dance. Saturday, July 17, will be occupied by a motor coach excursion to the Perthshire highlands.

## PAINT PROMOTES EXPORTS

**B** RITISH goods had a high reputation throughout the world for efficiency in design and presentation but they sometimes fell short of their competitors, declared Sir Steven Bilsland, Bt., at a recent Imperial Chemical Industries luncheon in Glasgow after the opening by Sir Hector McNeill, Lord Provost of Glasgow, of an exhibition designed to demonstrate how paint helps exports. Paint, he contended, was a prime factor in presentation, and the presentation of our goods was of the utmost importance in the development of export trade. Mr. G. Y. F. Campbell, chairman of the Paints Division of I.C.I., said we could no longer assume that our goods would sell themselves. We had to make something which buyers could not produce themselves.

## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

### Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.)

**LAFARGE ALUMINOUS CEMENT CO., LTD.**, London, W. (M., 8/5/48.) April 2, £25,000 4 per cent first debenture stock, part of an amount already registered. \*£35,000. October 9, 1947.

**PAL CHEMICALS, LTD.**, London, S.W. (M., 8/5/48.) April 1, charge, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; charged on land at Bray known as Bray Lodge Small Holding. \*Nil. January 14, 1947.

### Satisfaction

**DAVEY PAXMAN & CO., LTD.**, Colchester, engineers. (M.S., 8/5/48.) Satisfaction April 3, £2000, registered December 21, 1942, £2320, registered June 29, and £340, registered September 21, 1944, £380, registered June 25, 1945, and £460, registered January 14, and £1000, registered July 2, 1946.

## Company News

The total nominal capital of **Bowmans Chemicals, Ltd.**, the conversion of which to a public company was announced last week, is £150,000.

The nominal capital of **Vulcan Chemical Co., Ltd.**, has been increased beyond the registered capital of £5625, by £11,250, in 900,000 shares of 3d. each.

The name of **S. F. P. Synthetic Fine Products, Ltd.**, chemicals, etc., 12 Henrietta Street, London, W.C.2, has been changed to **Fine Products & Enterprises, Ltd.**, as from March 25.

The nominal capital of **Greeff-Chemicals Holdings, Ltd.**, 12 Finsbury Circus, London, E.C.2, has been increased beyond the registered capital of £250,000 by £75,000, in 5s. ordinary shares.

The nominal capital of **Synthite, Ltd.**, manufacturers of synthetic materials and chemicals, etc., Ryders Green, W. Bromwich, has been increased beyond the registered capital of £50,000 by £50,000, in £1 shares.

The nominal capital of **Scottish Heather, Ltd.**, chemical manufacturers, etc., 174 Old Shoreham Road, Hove, has been increased beyond the registered capital of £100 by £4900, in £1 shares.

The nominal capital of **John Townsman, Ltd.**, chemical manufacturers, etc., 5a Allington Street, London, S.W.1, has been increased beyond the registered capital of £500, by £2500, in £1 ordinary shares.

**British Titan Products, Ltd.**, announces that it has filed a capital increase of £2,875,000 above the registered capital of £1,125,000. The increase is in one million 4½ per cent cumulative preference, one million ordinary, and 875,000 unclassified shares, all at £1 each. Shareholders include Goodlass Wall and Lead Industries, Ltd., I.C.I., Non-Ferrous Metal Products, Ltd., and Titan Co., Inc., New York.

## New Companies Registered

**Melzone Manufacturing Co., Ltd.** (453,184).—Private company. Capital £1000. To acquire the business of a chemical manufacturer carried on by George Mitchell, at 13 Sandgate High Street, Folkestone. Directors: G. Mitchell and Alison E. Mitchell. Reg. office: 13 Sandgate High Street, Folkestone.

**McCowans Seaweed Products, Ltd.** (26,219).—Private company. Capital £5000. To acquire the business now carried on by D. T. McCowan as McCowans Seaweed Mills, Oban, and to carry on the business of manufacturing food or other products from seaweed, etc. Directors: D. T. McCowan, Soroba House, Oban, Argyll, and J. G. Carson.

## Chemical and Allied Stocks and Shares

**GENERAL** conditions in stock markets showed little change, business earlier in the week being held in check pending the Foreign Secretary's Commons statement. Moreover, the debate on the Finance Bill should clarify the investment income levy. British Funds turned easier, sentiment reflecting the poor National Savings figures, but helped by further good financial results, industrial shares have been firmer, although owing to dividend limitation, shareholders do not benefit from higher profits.

**Imperial Chemical** at 49s. 9d. have remained steady at the time of writing, awaiting the full results. **B. Laporte** 5s. ordinary changed hands around 21s. 4½d., **Fisons** were 60s. 3d. on the results, **Amber Chemical** 2s. shares showed firmness at 10s. 6d.,



and Albright & Wilson 5s. ordinary were 30s. 6d. British Glues & Chemicals were 23s. 3d. and helped by the statements at the annual meeting, British Oxygen were active at 99s. 4½d. British Aluminium showed firmness at 50s., but following the reduced payment by Bryant & May, British Match Corporation shares fell back to 41s.

Under the influence of the past year's higher profits, United Molasses strengthened to 50s.; actual resources employed in the business are substantially in excess of the issued ordinary capital; but the Bonus Tax makes a share bonus impossible for the time being. In other directions, Turner & Newall were 77s. 9d., and Dunlop Rubber 73s. 6d.

Babcock & Wilcox have risen to 72s. 3d. following the further profit increase shown by the results, which enables £100,000 to be placed to general reserve, the dividend total again being 15 per cent. Goodlass Wall 10s. shares at 36s. 9d. were unaffected by the £2,875,000 increase in the registered capital of British Titan Products. Shareholders in the latter include Goodlass Wall, R. W. Greeff & Co., Imperial Chemical, and Non-Ferrous Metal Products (a subsidiary of Imperial Smelting).

Elsewhere, Pinchin Johnson have firmed up to 57s. 6d. awaiting terms of the expected new issue. Lewis Berger were £8½, and International Paint £8½. British Plaster Board eased to 24s. 6d., but awaiting the full results, Associated Cement have been steady at 72s. 9d. Shares of companies connected with plastics attracted a fair amount of attention, but movements on balance were small, British Xylonite being £6½, with De La Rue 43s. 9d., and British Industrial Plastics 2s. shares 8s. 6d.

Iron and steels have been unaffected by reports that the Government is not abandoning its nationalisation plans in respect of steel producers and that a Bill for this is likely to be introduced before the end of the year. United Steel were 30s., and Colvilles 31s. 9d. In other directions, Lautaro Nitrate further improved to 38s. 6d. Boots Drug were steady at 54s. 1½d., British Drug Houses 5s. shares changed hands around 11s. 3d., and elsewhere, Glaxo Laboratories were £17½. Sangers have been firm at 35s., Beechams deferred were better at 22s., and Griffiths Hughes 37s. Although there has not yet been a Government decision on reopening of the London Metal Exchange, Amalgamated Metal held their rally to 21s. 9d., and Metal Traders' shares were 50s. Oils have been uncertain. Anglo-Iranian were £8½, with Shell 76s. 3d. Burmah Oil 67s. 6d., while VOC at £6½ have risen on higher dividend talk and renewed suggestions that the shares may be

"split" into a lower denomination. The Trinidad group was better with Trinidad Leaseholds 5s. ordinary at 33s. 9d.

## British Chemical Prices

### Market Reports

THERE has been little of fresh interest to report on the industrial chemicals market during the past week, and active trading conditions continue in most sections. The export of chemicals during recent months has been exceedingly satisfactory and there are no signs of any contraction in the volume of overseas inquiry. With regard to home trade, delivery specifications have covered good volume and pressure for supplies seems to be the experience of most producers. Among the soda products, chlorate, bichromate and caustic soda are moving well, and the demand for soda ash is well above available supplies. In other directions there is a good call for hydrogen peroxide, sulphur and white powdered arsenic, while the demand for formaldehyde is fully maintained. The tartaric and citric acids are in strong request at unchanged rates. There is also a good outlet for the lead oxides. Active conditions persist in the coal-tar products market with pitch continuing to enjoy a good demand both on the home and export account.

MANCHESTER.—The announcement last week-end by leading chemical manufacturers of lower prices over a wide range of products has resulted in rather less new inquiry on the Manchester chemical market during the past few days pending evidence how this is likely to affect other price schedules. There has, however, been a continued steady flow of delivery specifications for the alkali and other heavy chemicals against orders already held by manufacturers. In the fertiliser section, there is a pressing demand for sulphate of ammonia, superphosphates and the compounds and supplies are being fully absorbed. Trading conditions on the tar products market so far as the leading light and heavy materials are concerned are active and good quantities are being taken up.

GLASGOW.—Business continues to be very quiet in the Scottish chemical market. This is not a seasonal effect and appears to be the reflection of a general feeling of instability. There are signs that firms which previously carried fair stocks of chemicals now purchase only for their immediate requirements. In the export market conditions have been a little better than of late and a number of orders have again been booked. There has been a particularly heavy demand for potassium permanganate.

## Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2 at 1s. each. Higher priced photostat copies are generally available.

### Complete Specifications Accepted

Alloy.—C. C. Misfeldt. July 5, 1943. 600,303.

Production of acrolein.—Distillers Co., Ltd., and W. A. Smart. Nov. 8, 1943. 600,454.

Separation of pyrites, arsenopyrite, and pyrrhotite by flotation.—American Cyanamid Co. Feb. 2, 1943. 600,456.

Manufacture of insecticidal compositions.—J. R. Geigy A.G. March 4, 1943. 600,307.

Process for the production of acridine derivatives bearing cyano substituents.—Ward, Blenkinsop & Co., Ltd., A. A. Goldberg, and W. Kelly. May 12, 1944. 600,354.

Manufacture of molecular sieve absorbents.—R. M. Barrer. Sept. 23, 1943. 600,465.

Flow-meters.—Fischer & Porter Co. Aug. 13, 1943. 600,402.

Alkylation of aromatic hydrocarbons.—C. Arnold. (Standard Oil Development Co.) Sept. 26, 1944. 600,505.

Process for the low temperature polymerisation of olefinic materials.—J. C. Arnold. (Standard Oil Development Co.) Nov. 14, 1944. 600,317.

Manufacture of synthetic resinous condensation products.—Beck, Koller & Co. (England), Ltd., E. A. Bevan, and R. S. Robinson. Nov. 16, 1944. 600,408.

Production and recovery of isoparaffins more particularly isopentanes.—Anglo-Iranian Oil Co., Ltd., A. P. Shearer, and T. Cubin. Nov. 17, 1944. 600,468.

Manufacture of copper base alloy products containing some aluminium.—Bridgeport Brass Co. July 15, 1942. 600,318.

Catalytic conversion of hydrocarbons.—Universal Oil Products Co. Jan. 14, 1944. 600,470.

Separation of particulate materials.—I.C.I., Ltd., and M. H. M. Arnold. June 20, 1945. 600,326.

Manufacture of solutions of polyvinyl derivatives.—Soc. Rhodiacta. June 21, 1942. 600,490.

Method of and apparatus for oil purification.—Youngstown Miller Co. July 29, 1944. 600,332.

Pyrimidine compounds.—I.C.I., Ltd., A. F. Crowther, F. H. S. Curd, B. J. Lovell, H. T. Openshaw, and A. R. Todd. Nov. 12, 1945. 600,337.

Modifying leather by treatment with sulphonated polymeric materials.—E. I. Du Pont de Nemours & Co., M. T. Goebel, and J. S. Kirk. Sept. 21, 1945. 600,369.

Production of methyl amino-phenol.—Soc. des Usines Chimiques Rhone-Poulenc. Oct. 17, 1944. 600,426.

Process for the concentration of acetaldehyde.—Distillers Co., Ltd., British Industrial Solvents, Ltd., E. C. Craven, E. H. Harbard, and K. H. W. Tuerck. Oct. 26, 1945. 600,525.

Centrifugal pumps.—Franks & Saunders, Ltd., and H. J. Franks. Oct. 29, 1945. 600,339.

Process for the purification of sugar-containing liquids.—N.V. Octrooien Maatschappij Activit. Oct. 18, 1939. 600,528.

Sulphanilamido pyridazones.—W. N. Haworth, and L. F. Wiggins. Nov. 12, 1945. 600,532.

Insecticidal compositions.—May & Baker, Ltd. (A. C. Benzie.) Nov. 12, 1945. 600,533.

Liquid atomisers.—Whistle Products, Ltd., and W. J. Darby. Nov. 20, 1945. 600,534.

Portable containers for liquefied gases.—Linde Air Products Co. Jan. 17, 1945. 600,441.

Manufacture of halogen substituted aryl ethanes.—J. R. Geigy A.G. March 4, 1943. 600,350.

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Cellulose Adhesives	Methylene Chloride	Sodium Chlorate	Thio Urea
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Applications should be made as soon as possible, and in any case not later than 29th May, 1948, whereupon forms will be issued requiring particulars of age, nature of employment and the manner in which the Grant would be used.

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## SITUATION VACANT

*None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that Order.*

A factory engaged in light engineering manufactures in South Bedfordshire requires the services of an Assistant Works Chemist. Applicants should have a good degree in chemistry or equivalent qualifications, and industrial experience would be an advantage. Duties will be to assist in the control of factory processes such as plating and painting, in addition to checking raw materials. Ability to take responsibility would be an asset for an appointment with good prospects for a suitable applicant. Where possible, an indication of approximate salary expected would be appreciated. Apply Box No. 2641, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

## SITUATIONS VACANT

CHEMIST, of wide experience and good knowledge of technical German, wanted for the examination and indexing of scientific and technical documents for minimum period of six months. Salary £400-£500 p.a. according to attainments. Reply, A.B.C.M., 106, Piccadilly, W.1.

CHIEF Chemist for synthetic ammonia works in South India; producing 60,000 tons sulphate annually from wood gasification and using gypsum process; ability to organise complete chemical control throughout whole works; climate and living conditions good, very stable area politically. Salary £1,500 upwards depending on qualifications and experience; two or three year contract as desired; return passages for appointee and wife. Box No. 2653, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

GRADUATE organic chemist age 25-35 years required in Yorkshire, preferably with practical experience in the production of synthetic resins and similar materials. Knowledge of physical chemistry an advantage but not essential. Salary according to age and qualifications, superannuation scheme in operation. Replies to Box No. 2657, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

HOPKIN & Williams, Ltd., require Chemists and Juniors for their St. Cross Street laboratories, E.C.1 for analytical and preparative work.

ORGANIC CHEMIST or Chemical Engineer wanted for hydrogenation process at works near Manchester; initially for development including catalyst preparation, subsequently to take charge of plant. Previous experience in this branch is desirable. Write giving details of age, qualifications, experience and indication of salary required, to Box No. 2648, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4. This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order 1947.

PLANT Chemists urgently required for process plant operation by large company operating in the Middle East. Applicants need not be Graduates but should have had a chemical training up to Inter. B.Sc. or National Certificate Standard with experience of shift work in either a gas, coke oven or chemical works. Age not over 30. Salary according to qualifications and experience plus generous allowance in local currency, with free furnished bachelor accommodation, passages out and home, medical attention, also kit allowance and Provident Fund benefits. Apply stating age, qualifications and experience, etc., to DEPT. F.22, Box 1021, at 191, Gresham House, E.C.2.

WANTED by firm of paper merchants in London. A technical assistant able to speak French and with knowledge of chemistry up to the standard of Higher School Certificate. Age between 20 and 25. Application with photograph and full particulars of education and previous experience (if any), stating salary required. Please send to Box No. 2658, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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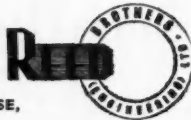
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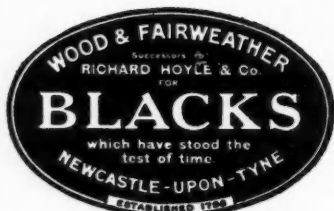
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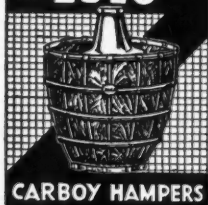


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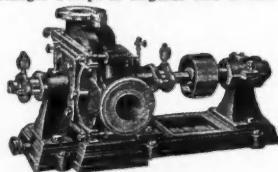
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